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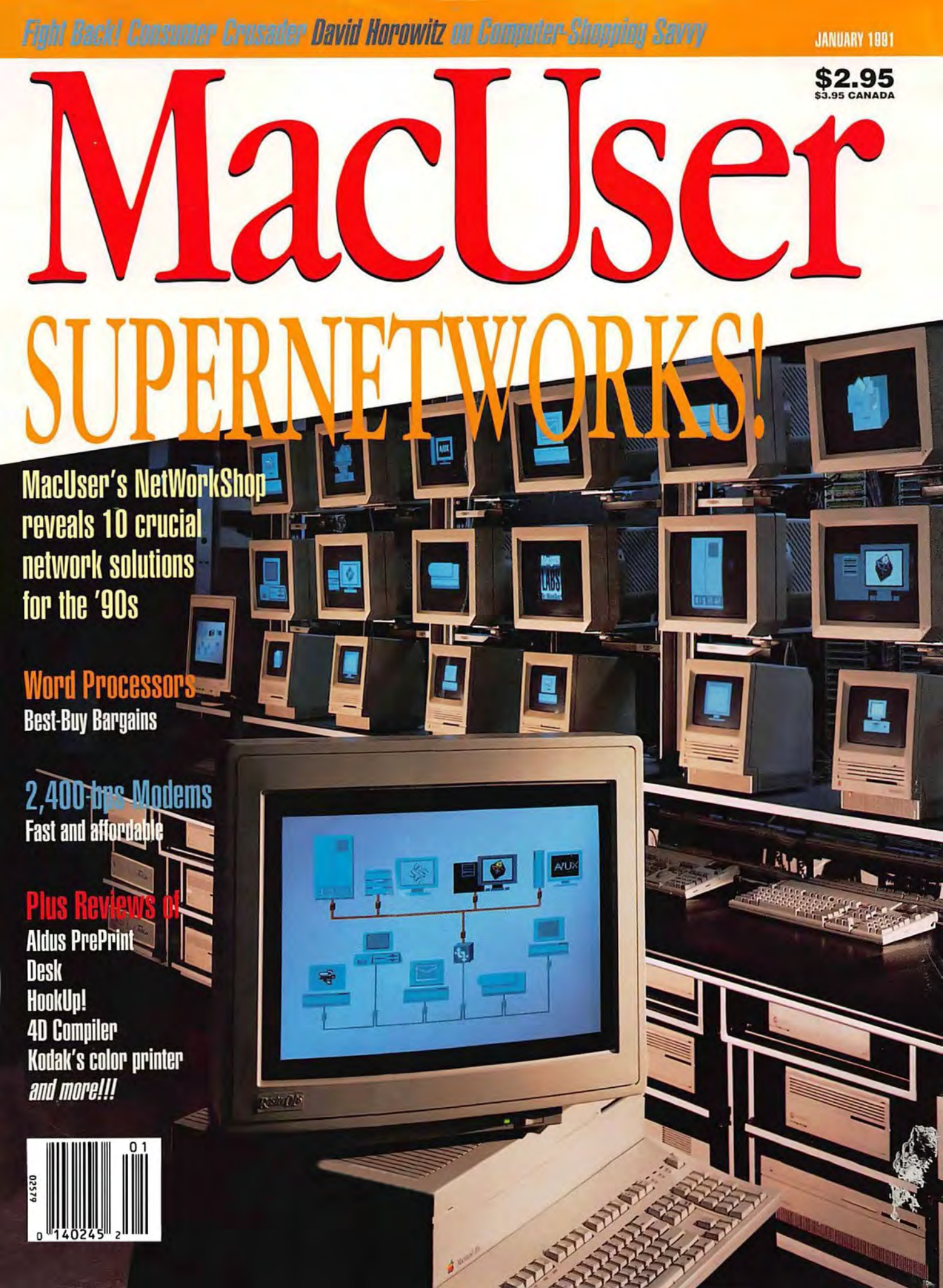
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MacUser's NetWorkShop reveals 10 crucial network solutions for the '90s

Word Processors
Best-Buy Bargains

2,400-bps Modems
Fast and affordable

Plus Reviews of
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JANUARY 1991

Volume 7 Number 1



92
Take a guided tour of connectivity technologies in the MacUser Labs NetWorkShop.



100
The humble modem evolves into a high-performance communications tool.



174
Consumer crusader David Horowitz tells how to be a savvy Mac buyer.









156
Word processing has never been so easy — or inexpensive.

Features

Networking the '90s
BY JOHN RIZZO AND JON ZILBER
If you share electronic information with other computer users, your business depends on your network connections. Here's a primer on the top technologies to get you plugged in to the '90s. **92**

Thoroughly Modern Modems
BY STEPHEN SATCHELL AND THE MACUSER LABS STAFF
A modem is a modem is a modem, right? Nope; new technologies and features translate into significant differences among high-end 2,400-bps modems. We pushed eight Mac-specific turnkey packages to their limits and discovered that the best 2,400-bps modems deliver close to 9,600-bps throughput. If you like getting four times what you bargained for, read on. **100**

The Best of UNIX and the Mac: A/UX 2.0
BY ALEXIS ROSEN, JEFF PITTELKAU, AND THE MACUSER LABS STAFF
A/UX is the most interesting and impressive software from Apple since HyperCard. And it's the only UNIX system that offers a large base of productivity applications that offer cut-and-paste compatibility among UNIX files. **118**

The Invisible Bridge to Mainframe Data
BY VERNON KEENAN, PAUL YI, AND THE MACUSER LABS STAFF
If you want to access your firm's mainframe-based data with your Macintosh and if you want the mainframe to shoulder most of the task of finding that data, you're in luck — Apple's DAL, Oracle's SQL*Net, and TechGnosis' SequeLink all do it well, although in quite distinct ways. **138**

Best-Buy Bargain Word Processors
BY CHARLES SPEZZANO, KELLI WISETH, AND THE MACUSER LABS STAFF
Not everyone is writing novels or thick corporate manuals. (And even those who are may want a simpler tool for smaller jobs.) There are now four good low-cost word processors to choose from — Claris MacWrite II, the word-processing module of Microsoft Works 2.00, New Horizons WordMaker 1.01, and T/Maker WriteNow 2.2 — plus several shareware products. **156**

Buying Smart
BY SHELLEY ZULMAN
Puzzled about buying computer gear, finding good dealers and mail-order firms, decoding warranties, and figuring out what to do when a company goes bankrupt? Here's how to stretch your dollars and shrink your anxieties, along with advice from the host of the syndicated TV show "Fight Back! with David Horowitz." **174**

Departments

Jon Zilber
Taming the mouse menace. **31**

Robert R. Wiggins
The Mac has a dirty little secret: instability. **41**

Guy Kawasaki
How many spaces should go between sentences? **57**

John C. Dvorak
Apple is doomed — to succeed. **346**

Letters
Weenie computers or weenie columnist? **13**

Advertiser Index **292**

Marketplace **328**


DESKTOP PUBLISHING **195**

Prepress
Imagesetters and service bureaus: why and how. **197**

Step by Step
How to simplify the creation of complex graphics by using multiple drawing layers. **210**


BRIDGES **215**

Trouble Shots
Plan your LAN, even a plug-and-play one. **217**


POWER TOOLS **220**

Power Techniques
Exploring the Print dialog box. **220**

Power Techniques
Make the Portable's battery last even longer. **229**

Beating the System
Ten things — such as rebuilding your desktop — that you should start doing this year. **237**

The Expert's Edge
Forget scanners. If you want to get photos into your DTP productions, get a Canon XapShot electronic-imaging camera. **245**

Power Programming
Text Browser was nice in its day. Now let's look at Byte Browser, clear hex display and all. **255**

Tip Sheet
An editable Clipboard, how to proof 300-dpi color material with tinted text, and more. **265**

Help Folder
MacDOS, the department of redundancy department, and more. **275**

Reviews

Kodak XL7700
Kodak ushers in a brand-new era of true photographic-quality printing with this continuous-tone color printer. But it's not exactly cheap. **62**

4D Compiler
Imagine the versatility of 4th Dimension combined with pure, unadulterated speed? Stop imagining; it's already here, thanks to what may be the single most important tool of all time for 4th Dimension developers. **65**

Aldus PrePrint
If consistent color separations for PageMaker are what you need, then PrePrint's the utility that might finally make it possible. **70**

Desk
It's seven . . . seven . . . seven DAs in one! But although this combination program takes aim at Microsoft Works, does it add up to the sum of its parts? **74**

TelePort A300
Elegant is the word for this inexpensive and feature-packed 2,400-bps fax modem that even saves you a port by plugging in to the ADB port along with your mouse and keyboard. **79**

HookUp!
The hobby-shop electronic-module kits of yesteryear meet the age of multimedia in this novel icon-oriented programming tool for all ages. **83**

Project Scheduler 4
Project-management specialists — especially those working in mixed Mac and PC environments — will discover that this new entrant offers an impressive set of features but some interface frustrations as well. **86**

"Well, see, the drive on my IIci went out on me. I took it to my regular dealer, who immediately replaced the drive at no cost and then treated me to dinner and a movie before driving me home." **178**



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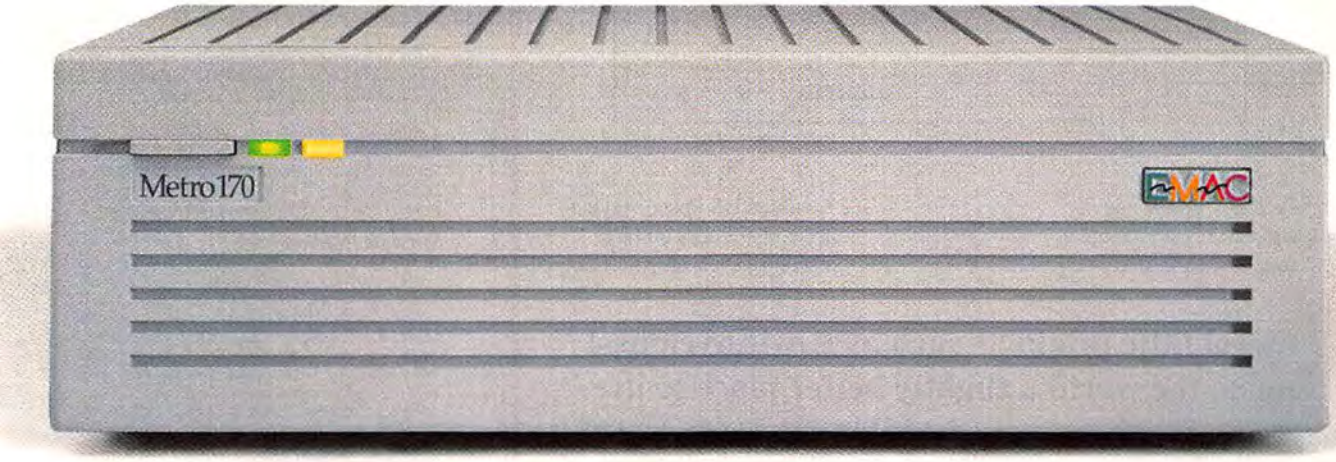
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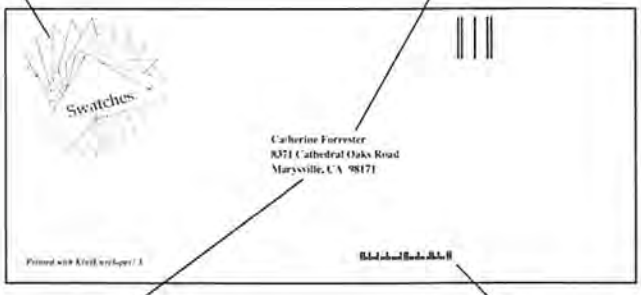
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About MacUser

No Mac Is an Island

It was time to expand our lab facilities. We needed to test more and more products under rigorous laboratory conditions. The most pressing research topics — in terms of reader interest and testing difficulty — were networking and connectivity. So we constructed a new half-million-dollar facility to explore these areas and more.

Sounds easy. It wasn't. But the MacUser Labs NetWorkShop connectivity center is finally a reality. It's come a long way from our first network-testing facility, which overflowed from a cubicle to two cubies; to two cubes and a corner office; and finally into a custom-built, state-of-the-art, dedicated laboratory for testing Macintosh networks under the real-life conditions of mixed platforms.



***MacUser*'s Stephan Somogyi luxuriates in his natural habitat, our fabulous new NetWorkShop connectivity laboratory.**

Henry Bortman, our technical director, spearheaded the effort. His right-hand man for the past year and a half has been project leader Stephan Somogyi. In addition to being a networking and connectivity maven of note, Stephan is also our resident software-development expert and the author of the Labs' standard hard-disk-benchmark program, DiskBasher!.

Stephan has compiled some of the NetWorkShop's industrial-strength statistics: The NetWorkShop includes more than 30 Macs, a NeXTcube, a Sun SPARCstation IPC, a DEC MicroVAX 2000 and a VAXserver 3100, a Compaq 386/33 Deskpro and a Compaq Deskpro 286, a Zeos 386, and an IBM PS/2 Model 80. These machines run a variety of operating systems — including DOS, OS/2, Windows, and A/UX 2.0 (Apple's flavor of UNIX) mounted on a IIfx — and multiuser network packages — including Novell NetWare and 3Com 3+ Open file servers. Even the lab's windows are special: The electrostatic windows go from transparent to opaque with the flip of a switch, maintaining privacy and security for the evaluation of trade-secret prerelease products.

But the real beauty of the MacUser Labs NetWorkShop is the way the lab team organized and linked the dozens of machines. For example, the modular-Macintosh CPUs are packed together like San Francisco row houses and are stored on specially designed carts with rollout shelves below the tabletops for maximum access. Stephan and Henry linked the CPUs by first assigning each machine a junction box with four jacks: one for LocalTalk, one for twisted-pair Ethernet, one for token ring, and an extra one for modem connections or other twisted-pair-based applications. The junction boxes were then linked to patch panels that can easily be switched and reconfigured from a central location.

All told, it took more than 30 miles of wiring to complete the lab; it's just one more way that MacUser Labs goes the extra mile — or 30 — to get the job done.

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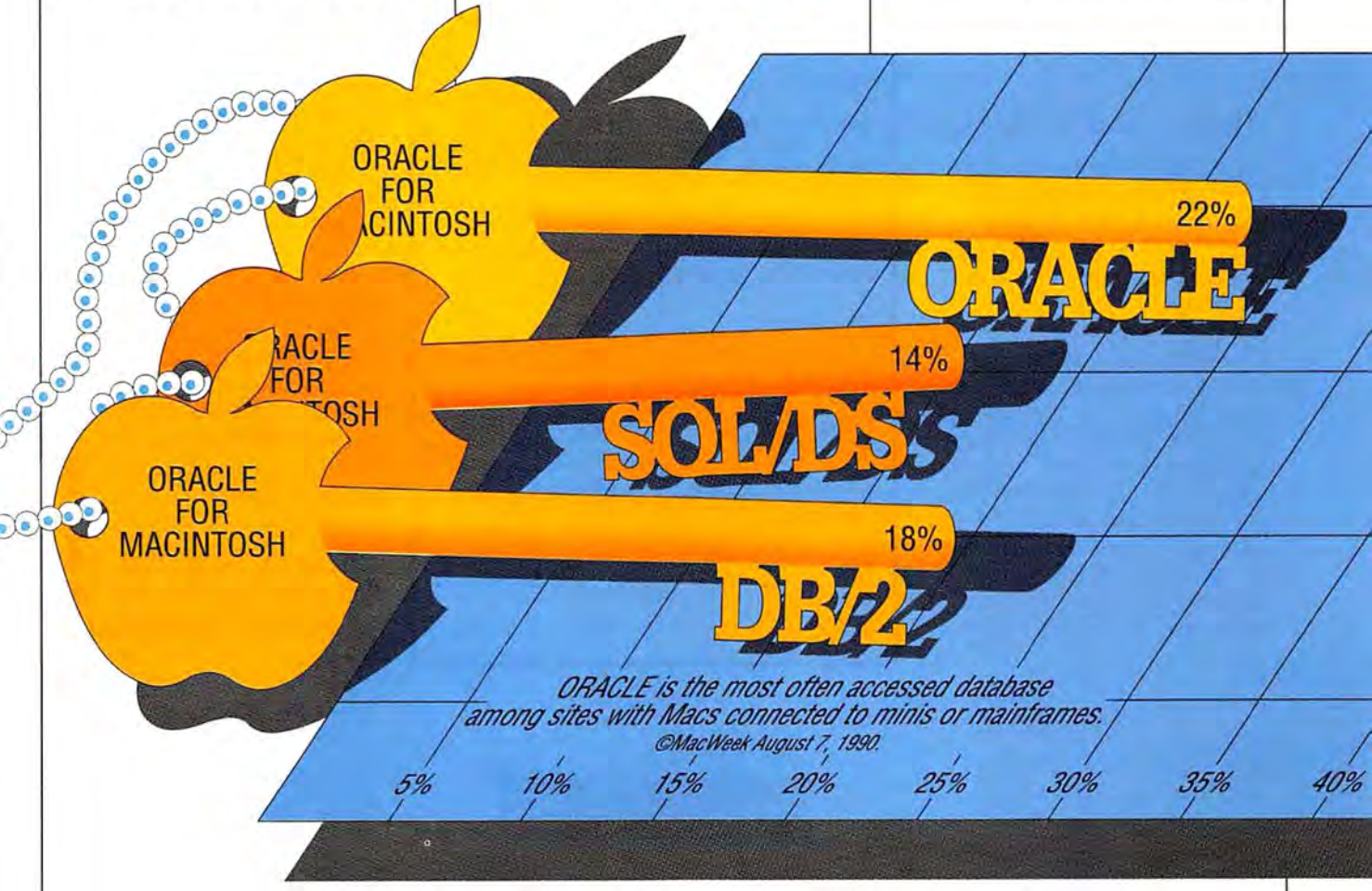
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LETTERS



Contributing editor Guy Kawasaki's famous grin and sports coat (see SPY *magazine, October '90, page 13) may yet brighten the Apple boardroom (November '90, page 47). John Hudson of Portland, Oregon, is one of many* MacUser *subscribers already in the Kawasaki camp: "I am inclined to buy 1,000 shares of Apple just so I can vote for him. If he actually gets anywhere (beyond tongue-in-cheek), please advise — it'd be a blast." One thing's for sure — even if Guy does get a seat on the board, his tongue is unlikely to be dislodged from his cheek for long.*

✉ *Write to Letters to the Editor, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of Zmac, our on-line service.*

All letters become the property of MacUser, *and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.*

A Retouch of Evil

Ken Milburn's roundup of color image-retouching applications ("What a Color-Retouching Program Can Do for You," October '90, page 172) was technically informative, but I find it irresponsible to devote 12 full pages to image enhancement without one word on the ethical or legal considerations involved in electronic-image manipulation.

It's vitally important to preserve the integrity of photographic images used in an editorial setting. The message you're giving your readers is that if executives don't like their body, it's easy to just scan in another photo and — presto — they'll have whatever physique they want.

Advertising and promotional situations call for different standards, but for anyone involved in an editorial setting — such as an in-house publication, high school newspaper, or other member of the mainstream media — I urge development of a policy that controls the use of photographic manipulation.

Dave Seibert
Phoenix, AZ

In Vivid Color

Yours is the fourth review of PageMaker 4.0 that I've read (see review, September '90, page 46), and not one has mentioned that Aldus dropped the CYMK color-calibration model that was introduced in Color Extension. What's going on? Am I the only one who places any importance on CRT color accuracy?

I think Aldus has made a significant marketing blunder, because PageMaker's much-touted Pantone color-matching system is rendered virtually useless for anything but color laser printing.

The issue, as I see it, is whether a software manufacturer, after assembling a large customer dependency, has the right to arbitrarily decide which features should be included (or excluded) in future releases of its product without first conducting a user referendum on changes that significantly alter the way the software works.

Walter Blady
Toronto, Ontario
Canada

According to product manager Mark Craemer, PageMaker 4.0 doesn't have a monitor-calibration feature because "it doesn't adequately address the complex problems of color calibration. We were misleading people into thinking this was an appropriate solution, and it wasn't." The banished calibration feature involved matching screen colors to those on a monitor-adjustment card. This is a crude, inaccurate method for several reasons, one being that the colors on

Dear Mr. Sculley . . .

As we noted last October, John Sculley makes a healthy salary. OK, more than healthy — let's call it robust. All right, it's Schwartzeneggerian! But *MacUser* readers didn't have to exercise their imaginations too hard to think of ways that Mr. Sculley could honestly **earn his salary.** J. Reviere, of Conroe, Texas, thinks "he could hire an intelligent ad agency."

Paul R. Wollman, of Brandon, Manitoba, Canada, takes a more radical view. He thinks that Sculley should convert a fair portion of his salary into upgrading all Mac IIs "to run System 7.0 if it should ever materialize."

W. Brett Polonsky, Seattle, Washington, seems satisfied that Mr. Sculley is already doing enough but believes that "if, along with the purchase of any new Apple product, Apple would enclose a note that lists all the duties John Sculley performs as CEO, then the Apple community could rest easy, as I do, in knowing that he earns every penny."

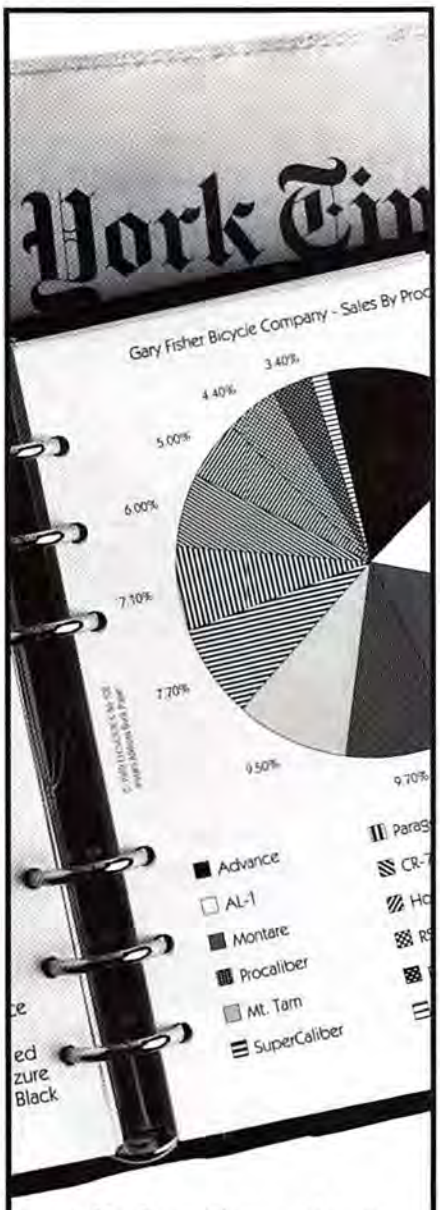
Before anyone accuses us of unmitigated Sculley-bashing, read what Peter T. Dueker, of Atherton, California, has to say: "John Sculley has already earned his salary for the next 25 years, for two reasons. First, when he came to Apple, he had to grab the reins of an out-of-control company and pull it out of a downward spiral.

"Second, I consider him a personal hero. I admire his values and his amazing skill in the fields of marketing and advertising. I sent John Sculley a letter requesting an autographed picture. I never actually expected him to respond. But when I opened my mailbox two weeks later, I was amazed to find that John Sculley had actually complied with my request, and for that I am eternally grateful." Eat your heart out, Lazlo Toth.

Mr. Sculley made his New Year's resolution early this year: Regain eroding market share. That means convincing people who now use other platforms to switch to the Mac.

Speak Up: What's the one best reason to switch to a Mac?

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the card can vary greatly from those produced by your combination of printer, paper, and ink. More sophisticated (and more accurate) calibration options are now available from Radius, Tektronix, and SuperMac. If you still want this sort of rough calibration, however, there's a simple workaround. Create a document containing boxes filled with the desired colors, print it, and adjust your monitor to match the paper output. And the best way to get Aldus' ear is through a user group; in fact, the national PageMaker User Group is cosponsored by Aldus. To join, call (800) 874-4113, ext. 25. — AA

Yes, I Scan

As a very content user of Logitech's hand-held scanner, I have to add the following two things to your article "An Inside Look at Scanners" (September '90, page 132): First, there's a nifty feature that lets you scan a graphic from left to right as though it were going from top to bottom; it's not only a timesaver but is also a great feature for those of us with limited RAM. I often scan graphics that are too wide to rotate in memory. Without this feature, I had to scan them in several strips, rotate each strip, and rearrange them to get the same result.

Second — and more important — you don't need a new head to use the new software, 2.0, which has 32 levels of gray. The new software works with the older models. Approximately a year after buying my scanner, I received the new software from Logitech free of charge — and even without ordering it. Big applause to Logitech for this great service!

Gernot P. W. Hecht
Nürtingen, Germany

Support Your Local Mac

I concur with Thom Hogan's message to Apple in "The Self-Supporting Mac" (October '90, page 263). Customer support is essential — not just because it is the right thing to do or because it's an effective sales tool. Customer support is essential for the feedback it can give developers on how the machines are used and on what works and what doesn't.

Bugs that get past quality assurance are found more quickly and fixed more easily if users are encouraged and trained to report them promptly and in detail. When developers know how users work, they can create enhancements and new programs that are truly useful.

I used to wonder how customers did useful work using imperfect systems. Now that I'm a Mac user, I have the opportunity to do just that as well as to experience customer support from the outside. Companies that skimp on customer support or that are arrogant or defensive toward customers who have problems are shortsighted; the companies will suffer more than the customers. The first signs of trouble at Wang Labs, where I worked for six years, were complaints about customer service.

Simon L. Klein
Chelmsford, MA

Getting Behind ISDN

I liked Stephan Somogyi's introduction to ISDN (Integrated Services Digital Network) ("Coming Soon to a Mac Near You: ISDN," October '90, page 227). One statement jumped out at me: "Compared with Europe and Japan, the U.S. is lagging behind." After living in Japan for six years, I returned here last year and was immediately shocked by the same observation. An entire article on that topic would be very useful. Japan's lead in setting up ISDN will give it a significant competitive edge in all areas of business at a time when the U.S. cannot afford yet another Japanese advantage.

John Elemans
76106,3443 via Zmac

Ready, Set, Prepress

The assertion that Mac color is not yet ready for prime time ("Prepress: The OPI Option," October '90, page 219) is not true. We are currently doing 90 percent of our color work on the Mac and hope to be doing 99 percent by the end of 1990.

OPI allows you to crop an image irregularly, if you have the proper software. Mac users will need to wait for the release of FreeHand 3.0 to see that.

The catch-22 situation you mention isn't a problem for us, because we don't go to the "high end" and all good designers know the approximate size they want to use when an image is scanned.

I do realize that we are one of the few places that do their everyday publishing on the desktop, but it's wrong to say that it can't be done just because most companies don't do it. We produce everything in-house on the Mac, from promotional brochures to catalogs to kindergarten books to physics books.

Alan Ordway
Pensacola Christian College
Pensacola, FL

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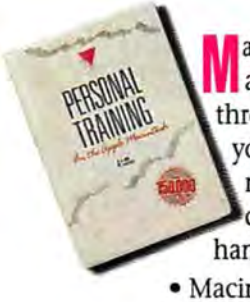
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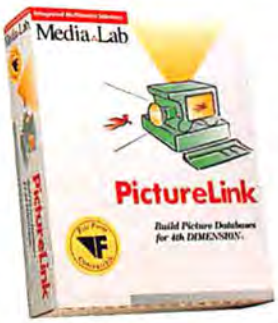
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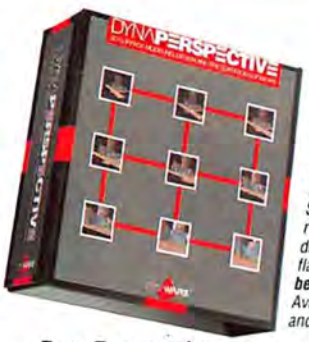
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Publications 31.
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Christian Images 38.

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ArtFonts Pak 49.

U.S. Micro Labs
Fontsizer II 62.

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DigiVideo B&W 350.
DigiVideo Color 638.
MicroTV 250.

Bright Star
Hyper Animator 1.5 97.
Interface 248.

Digital Vision
Computer Eyes-Color 348.
Computer Eyes-B/W 194.

Farallon
Media Tracks 188.
Multimedia Pack 318.
Multimedia Pack CD 318.

MacroMind
MacroMind Accelerator 124.
MacroMind Director 2.0 434.
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Claris Cad 2.0 624.
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Cricket Draw 167.

Generic Software
CADD for the Macintosh ... 374.
Generic CADD Level 1 83.
Libraries for Generic CADD available on request $$$.

Graphsoft
Blueprint 215.
MiniCad+ 3.0 594.

Innovative Data Design
Dreams 318.
Mac Draft 2.0 192.

Softstream International
Relational Objects 148.

Versa CAD
VersaCAD Drafter 495.

ENTERTAINMENT

Access Software
World Class Leader Board ... 26.

Accolade
4th & Inches 25.
FastBreak 27.
Grand Prix Circuit 27.
Hardball 25.
Mean 18 25.
Jack Nicklaus' Greatest 18 .. 35.

Activision
Cosmic Osmo 39.
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The Hobbit 22.
Fellowship of The Ring 22.
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The Crack of Doom 26.

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California Dreams
Blockout (B&W) 26.

Casady & Greene
Crystal Quest 2.2 27.
w/Critter Editor 38.
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Bard's Tale 30.
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Comment 2.0 63.
Lexpertise U.S.A. Inc.
MacProof 3.2.1 103.
Lifetree
Correct Grammar 2.0 53.
Microsoft
Word 4.0 238.
Paragon Concepts, Inc
Nisus 3.0 237.
Personal Bibliographic
ProCite 195.
Power Up!
Letter Writer Plus 51.
Preferred Publishers
Vantage 1.5 50.
Reference Software
Grammatik Mac 48.
SNA
Stylist 45.
Tactic
Magic Typist 45.
T/Maker
WriteNow 2.2 114.
Wordperfect Corporation
Wordperfect 1.0.4 228.
Working Software
Quickletter 71.
Xerox
Accutext 439.

GRAPHICS & DESIGN

Adobe
Photoshop 494.
Illustrator 3.0 338.
Streamline 2.0 224.
True Form 224.
Type Manager 2.0 54.
Type Reunion 37.
Type Align 57.
Collector's Editionl 75.
Collector's Edition II 125.
Publisher's Pack I 225.
II & III ea 250.
Aldus
Freehand 2.02 324.
PageMaker 4.0 494.
PageMaker Color Ext. 134.
PrePrint 328.
Altsys
Art Importer 2.0 88.
FONTastic Plus 50.
Fontographer 3.1 248.
Metamorphosis 148.
Broderbund
Print Shop 34.
TypeStyler 1.01 111.
CE Software
CalendarMaker 3.0 30.
Amazing Paint 64.
Claris
MacPaint 2.0 91.
SmartForm Designer 278.
Deneba Software
Canvas 2.1 184.
UltraPaint 124.
Design Science, Inc.
Math Type 115.
Para Font 80.
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Comic Strip Factory 36.
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Mac Vision 258.
Letraset
ColorStudio 644.
DesignStudio 488.
FontStudio 358.
ImageStudio 138.
LetraStudio 272.
ReadySetGo! 4.5 164.
Mainstay
Capture 3.0 44.
MicroFrontier
Enhance 234.
Pantone
Computer Color Book 45.
Paracomp
Milo 155.
ModelShop 368.
Swivel 3D 1.1 294.
Swivel 3D Professional 438.
Postcraft International
Laser FX 47.
Preferred Publishers
Exposure Pro 68.
Master Color 89.
Master Paint 45.
Quark
XPress 3.0 508.
QuarkExtras 53.
QuarkStyle 165.
Sabastian Software
Image Grabber 2.0 31.
Salient
Partner 1.01 55.
Silicon Beach Software
Digital Darkroom 243.
Super 3D 2.0 314.
SuperPaint 2.0 122.
Softview
if:X Forms Designer 168.
Solutions
Curator 68.
SmartScrap & Clipper 54.
Super Glue II 58.
Studiotronics
Colorset 1.5 228.
SuperMac Technology
PixelPaint 2.0 222.
PixelPaint Pro 388.
Synergy Software
Kaleidagraph 2.0 144.
Tactic Software
FontShare 148.
Icon-It 44.
Timeworks
Publish It! 218.
Publish It! Easy 108.
U.S. Micro Labs.
Fontsizer II 59.
Zedcor Inc
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MicroLeague Baseball II 37.

MicroProse
Pirates! 34.

Microsoft
Flight Simulator 1.02 31.

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Fool's Errand 31.
Harrier Strike Mission II 31.
Puzzle Gallery 1 - Carnival .. 25.
Puzzle Gallery 2 - America ... 33.

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Global Dilema-Guns & Butter33.
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Talking Tiles 26.

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Word Torture 3.0 28.
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Pronunciation Tutor 34.
French
Word Torture 3.0 28.
Pronunciation Tutor 34.
Verb or Tense Tutor 41.
German
Word Torture 3.0 28.
Pronunciation Tutor 34.
Verb Tutor 41.
Italian
Word Torture 3.0 28.
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EasyKana 115.

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Sound Clips 1 - 4 ea. 44.

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Turbo Pascal 1.1 66.
Turbo Pascal Tutor 1.0 46.

Digitalk
SmallTalk/VMAC 118.

Mainstay
V.I.P. 87.

Meridian
Mac Professional Developer Kit
Ada Compiler 1,575.

Microsoft
Quick BASIC 1.0 63.

Paragon Courseware
QUED-M 104.

Serius
Developer 339.
Programmer 210.
Animation Object & Communications Objectea. 64.

Symantec
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Think Pascal 3.0 158.
Think C 4.0 158.

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Prograph w/ Compiler 2.0 .244.

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Earthquest 51.

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Script Expert 44.
ICON Factory 44.

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Hyper TMON 2.8.4 56.

Individual Software
Individual Power Macros for Hypercard 34.

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MacroMind CD ROM 142.

Microsoft
Office CD ROM 598.

Silicon Beach Software
Super Card 1.5 195.

Softstream International INC
Authenticate and Mutate 75.
Hyper Hit I 118.
Hyper Hit II Relational 268.

Somak
Script Edit 43.

Spinnaker
Spinnaker Plus 2.0 114.

Symmetry
HyperDA 1.2 44.

Trendware
Xcal 70.

Wayzata Technologies
Quickart 174.
Seals in the US Gov't 55.
All of Mac Tutor 160.
Disc Tracy 80.
The USA Factbook 80.
The CIA Factbook 80.
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Vietnam Remembered 80.
GEM- Public Domain 75.

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Ram Portable 1MB SIMM . 330.

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Virtual - Mac II w/PMMU ... 187.
Virtual - SE/30, IIx, IIcx 112.

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68881 - 25MHz 345.
68882 - 16MHz 159.
68882 - 25MHz 250.
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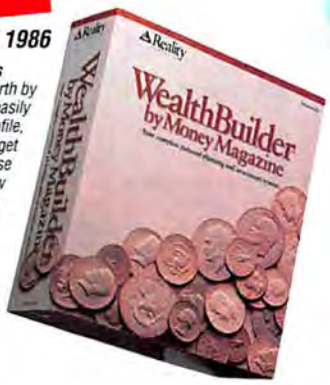
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2400 SE Int. (MNP5) 245.
2400 II Int. (MNP5) 259.
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NetModem V2400 428.
NetModem 9600V.32 1,418.

Software Ventures
Microphone II 3.0 214.

Solutions
BackFax 138.
FAX Gate Plus 1.1 238.
MailMaker 5 User Pack 116.

Supra Corp.
Supra 2400 118.
Supra 2400 MacPac 178.

Synergy Software
Versa Term 4.1 87.
Versa Term Pro 3.0 173.

Telebit
T-2000 19,000bps 995.
T-2500 V.42 Rel 6.01 1,050.

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In/Out (1-10 user) 186.
QuickMail 2.2
1-5 users 214.
1-10 users 314.
1-50 users 1,578.

DataViz
MacLink Plus PC 4.5 116.
MacLink Translators 97.

Dayna Communications
EtherPrint 350.
DaynaPort E/SE,II & 030 ... 355.
DaynaNET/4L 565.
8L 1,275.
XL 2,560.
8LE 1,560.
XLE 2,840.
Speed guard collision filter .. 52.

DaynaTalk for Macintosh
Single 95.
5 Pack 380.
10 Pack 715.

DayStar Digital
Local Talk Board
LT 200 MC 295.
LT 200 PC 185.

Farallon
LocalTalk -
PhoneNET DIN-8 31.
PhoneNET DIN-8 (10 Pk) 198.
PhoneNET DB-9 31.
Star Connector (single) 17.
Star Connector (10 Pk) . 1,125.
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SoftPC 241.
SoftPC Portable 244.
SoftPC EGA/AT 124.
Access PC 61.

Kinetics
EtherPort 469.
EtherPort Lattis Net 498.

Microcom Software
Carbon Copy Mac- 116.
TwinPak 168.

Nuvotech
NuvoLink II 271.
NuvoLink SC 309.
Turbo Bridge 318.
Turbo Net - DB-9 22.
Turbo Net - DIN-8 22.
Net Pack 12 DIN-8 198.
Turbo Net ST - DB-9 30.
Turbo Net ST - DIN-8 30.
Net Pack ST DIN-8 280.
Turbo Star 1,075.
Turbo Net to Appletalk adapt . 6.

Orange Micro
Grappler-
Mac to 512k Mac cable 26.
9 pin 78.
Spooler 46.
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Mac LX 127.
Grappler Plus 70.

Shiva Corporation
EtherGate 1,617.
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NetSerial 274.
TeleBridge 338.
Fast Path IV 1,895.

SuperMac Technology
Network Disk Fit 224.

TOPS
TOPS DOS Ver. 2.1 117.
TOPS 3.0 Network
Mac 178.
PC 3.5" 149.
PC 5.25" 149.
Flash Card (DOS) 149.
Flash Card Micro Channel . 195.
TOPS FlashBox
(Mac DB-9) 118.
(Mac DIN-8) 117.
TOPS Repeater 118.
TOPS Teleconnector 21.
TOPS NetPrint 2.0 118.

Traveling Software
Lap-Link Mac III
Connectiivity Pack 115.
Network Pack 175.

INPUT & OUTPUT DEVICES

Abaton Technology Corp.
Pro Point ADB 79.

Advanced Gravis
MouseStick 64.
MouseStick (ADB) 78.

Altra
Felix 116.

Datadesk
Mac 101 Keyboard 126.
Switchboard 168.

Kensington Microware
Turbo Mouse 105.
Turbo Mouse ADB 107.

Keytronics Keyboard
Mac Pro Kb-105 ADB 117

Kraft
QuickStick (512k & Plus) 39.
QuickStick ADB 49.

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Cordless 4 Button Cursor 64.
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Microtouch
UnMouse 185.

MSC Technologies
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Little Mouse A+ ADB 74.

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Abbott Systems
Canopener 1.1 62.

Affinity Microsystems
Tempo Plus $$$.

Aladdin Systems
Shortcut 39.
Stuffit Deluxe 62.

ALSoft
DiskExpress II 53.
Master Juggler 63.
MultiDisk 48.

ASD Software
Fileguard 138.
Fileguard Office Pack 5 348.
Fileguard Office Pack 10 578.

Baseline Publishing
Talking Moose 24.
Mac Cheese 58.
INIT Manager 35.
1 Shot Worksheet 59.
APB Express 59.

Beagle Bros Inc.
FLASH 98.

Berkeley System Design
After Dark 22.
Stepping Out II 2.02 48.

Borland International
SideKick 2.0 67.

Casady & Greene
AME single user 158.
1-5 584.
1-10 848.
QuickDEX 33.

CE Software
MockPackage Plus 59.
QuicKeys 2 93.
DiskTop 4.0 w/GOfer 62.

Central Point Software
Copy II Mac 7.2 22.
Mac Tools Deluxe 75.

Custom Applications Inc
Freedom of Press 3.0 248.

Dantz Development
Retrospect 143.
Retrospect Remote $$$.

Dariana Technology
Mac Sleuth 85.

Dubl-Click Software
Clickchange 45.
Calculator Const. Set 44.
Menu Fonts 3.0 28.

Fifth Generation
Disk Lock 2.0 117.
Fast Back II 117.
PowerStation 2.5 33.
Pyro! 4.0 24.
Suitcase II 48.
SuperSpool 5.0 57.
SuperLaserSpool 2.02
Single User 85.
5 pack 285.

Hyperpress Publishing
Step Ahead 56.

ICOM Simulations
Mac Kern 58.
On Cue 1.3 34.

Insight Development
MacPrint 1.2 88.

Kent Marsh
MacSafe II 106.
Night Watch 84.
Quick Lock 54.

Kiwi Software
Kiwi Finder Extender 64.

Loop Software
Picture Book 38.

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Magic Software
AutoSave II 23.
BackMatic 47.
Power ICONS 37.

Magna
Empower I 110.
Empower II 190.

Mainstay
Marco Polo single 151.
twin pack 257.
5 pack 517.
MarkUp single 127.
twin pack 257.
5 pack 517.

Microcom
911 Utilities $$$.
Virex 2.8 58.

Microlytics
Gofer 2.0 44.

Microseeds
INIT Picker 2.0 35.
Redux 48.
Screen Gems 1.0 38.
Rival 1.0 48.

Now Software
Now Utilities 2.0 78.
Screen Locker 44.

Olduvai
MultiClip 2.0 68.

On Technology
On Location 74.

Power Up
Calendar Creator 34.

Preferred Publishers
Personality 47.
Screen Shot 30.

Salient
Disk Doubler 3.0 44.

Softview
Mac In Use 3.0 69.

Software innovations
Hand Off II 51.

SuperMac Technology
Disk Fit 1.5 57.
Sentinel 2.0 85.

Symantec
S.A.M. 2.0 63.
S.U.M. II 90.
Norton Utilities 83.

Total Systems
Quick SANE 45.

Williams and Macias
Disk Finder 24.

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Organizer Jr. 68.

Ergotron
MacTilt 68.
Mouse Cleaner 360 9.

I/O Designs
MacLuggage
Imageware II 48.
Macinware Plus 64.
Macinware SE 78.
Macinware Mac II 98.
Maninware IICX 84.
The Ultimate SE Case 78.
Neon Ultimate Carrying Case
Fluorescent Green 88.
Hot Pink 88.
Brilliant Yellow 88.

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Teakwood Disk File Cabinet
45 Disks 14.
90 Disks 21.
135 Disks 30.

Kensington Microware
Dust Cover SE XKB 9.
Dust Cover SE 9.
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SE Rad./Anti-Glare Filter 51.
Anti-glare Filter 13" Apple 63.
System Saver 63.
System Saver SE 52.
Universal Printer Stand 15.
Mac II Stand w/o cable 19.
Mac IIcx Monitor Stand 54.
Mac II Monitor Stand 64.
Mac II Mon. Cable Ext. Kit 32.
Masterpiece Mac II 105.
Extended ADB Cable 24.
Universal Copy Stand 22.
Tilt Swivel 21.
Printer Muffler 80 43.
Power Tree 10 19.
Power Tree 20 27.
Power Tree 50 54.
Apple Security Kit 34.
LaserWriter II Security Kit 32.
A-B Box (DIN-8) 63.
SuperBase 31.
PowerBacker 360 269.
PowerBacker 450 337.
PowerBacker 520 397.
PowerBacker 800 746.
PowerBacker 1200 946.
Pass Proof 70.
SideClip 6.

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Apple 13" monitor & ext. keyboard 18.

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Deluxe Plus/SE XKB 68.
Black
Mac IIcx/ci 75.

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LETTERS

C Is for Cylinder

Having been intimately involved with both hardware and software on mainframes since 1957, I was dismayed when the vacuum tube was put to rest and high-level languages were born. Nonetheless, I continued to feel that I had a pretty good grasp of things — until I saw Figure 1 for the article "The File System" (October '90, page 279), that is.

In my day, a cylinder consisted of all the tracks on all the platters directly under the read/write heads. Thus there would be one or two read/write heads for each platter, not one for each cylinder. We would therefore seek (move the heads) from cylinder to cylinder and endure rotational delay from sector to sector within a track.

Colin Jameson
Alturas, CA

OOPs, as the object-oriented programmers say. Let's just say we weren't firing on all our cylinders that day. —JB

Taking Apples to Market

Why doesn't Apple make more direct comparisons between its products and those from other manufacturers? I see no apparent effort by Apple to refute the rampant and fallacious claims regarding the price/performance ratio of Macs vis-à-vis the DOS/Windows systems. I wish I had a dollar for every article in *USA Today*, *The Wall Street Journal*, *BusinessWeek*, and the rest claiming that Windows now gives the masses the same capabilities as the Macintosh does, for half the price. I'd also like to see Apple provide dealers with training and materials for the purpose of counteracting this perception.

The broadcast media have also jumped onto the Microsoft/Windows bandwagon. I never cease to be astonished at how far they go with outrageous absurdities. A writer appearing on a local TV show was asked which computer companies showed the most promise in the home-computer market. She replied, "IBM and Tandy." When the host asked, "What about Apple?" the "expert" responded, "Not everyone can afford to spend $10,000 for a home computer."

If Apple wants to reach the masses, it needs to put its computers into public places such as restaurants, grocery stores, bars, and shopping centers.

All it takes is imagination.

Hal W. Keeler
Jefferson City, MO

The Old Gray Flair

The cover of your October issue is striking! Even the address label fits into the design.

Your carefully planned layout is an inspiring example to desktop publishers that black-and-white (with or without limited color) can be bold, attention-getting, and beautiful at the same time. Thanks for reminding us.

Mary Corman
Livermore, CA

How to Skin a C•A•T

I almost completely agree with your review of C•A•T III (see review, October '90, page 83). You criticize the word processor's lack of features, and it is certainly no Microsoft Word. But it has one feature — automatic merging of names, addresses, and so on — that makes it my most-used word processor (I have three). It lets me get a letter out the door minutes after conceiving it. This ability alone leaves my officemate green with envy.

I feel that reviewers ought to rate programs by considering if the built-in functions can be provided by alternatives. For me, so far, nothing compares with C•A•T. It's not my favorite program, but it is my most useful one. The improvements that your review calls for would indeed be welcome.

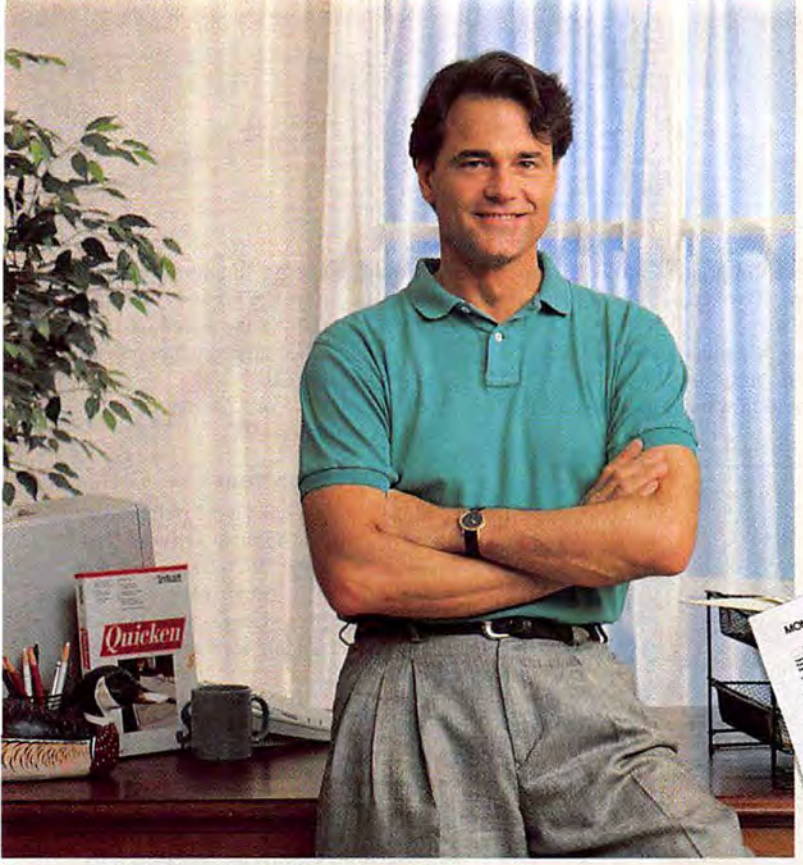
Donald A. Smith
Coral Gables, FL

Having read your review of C•A•T III, I found your three-mouse rating to be quite generous. As a C•A•T user from the time version 2.0 was first introduced — still the superior version in my opinion — I've witnessed a steady performance decline in each successive version, culminating in the infuriating, confounding version III.

The current version is agonizingly slower than earlier ones, which, according to Chang Labs, is because more features have been added, making the program larger but ultimately more versatile. I'll take the speed, thanks.

Also, the manuals are unbelievably awkward and confusing. The authors of these masterpieces must have had a hand in producing the IRS' tax-simplification documentation.

But the claw that broke the kitty's back for me is the new version's inability to access and print database reports that use notes I've been accumulating for almost



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Where did my money go? As I pay my bills, Quicken automatically notes each type of expense — utilities, clothing, charity, whatever. Then a simple click gives me a report showing how much I spent in every expense category each month.

How am I doing? Another click shows my budget vs. actual. Credit application? In seconds I've got a financial statement showing income, expenses, and net worth. Tax time? No sweat. Quicken provides one report with all my itemized deductions.

It's fast.

Time to pay bills? Quicken has "memorized" all my regular payments. I just confirm the amounts and Quicken prints out checks for me to sign. I still use my regular checkbook when it's more convenient. Either way, Quicken instantly keeps my accounts balanced and organized.

It's easy.

Getting started is no problem. There is no set-up involved. No chart of accounts to create. No stacks of old records to enter. I was recording checks in 3 minutes. That simple. Someday I just might read the rest of the manual to see what else Quicken can do.



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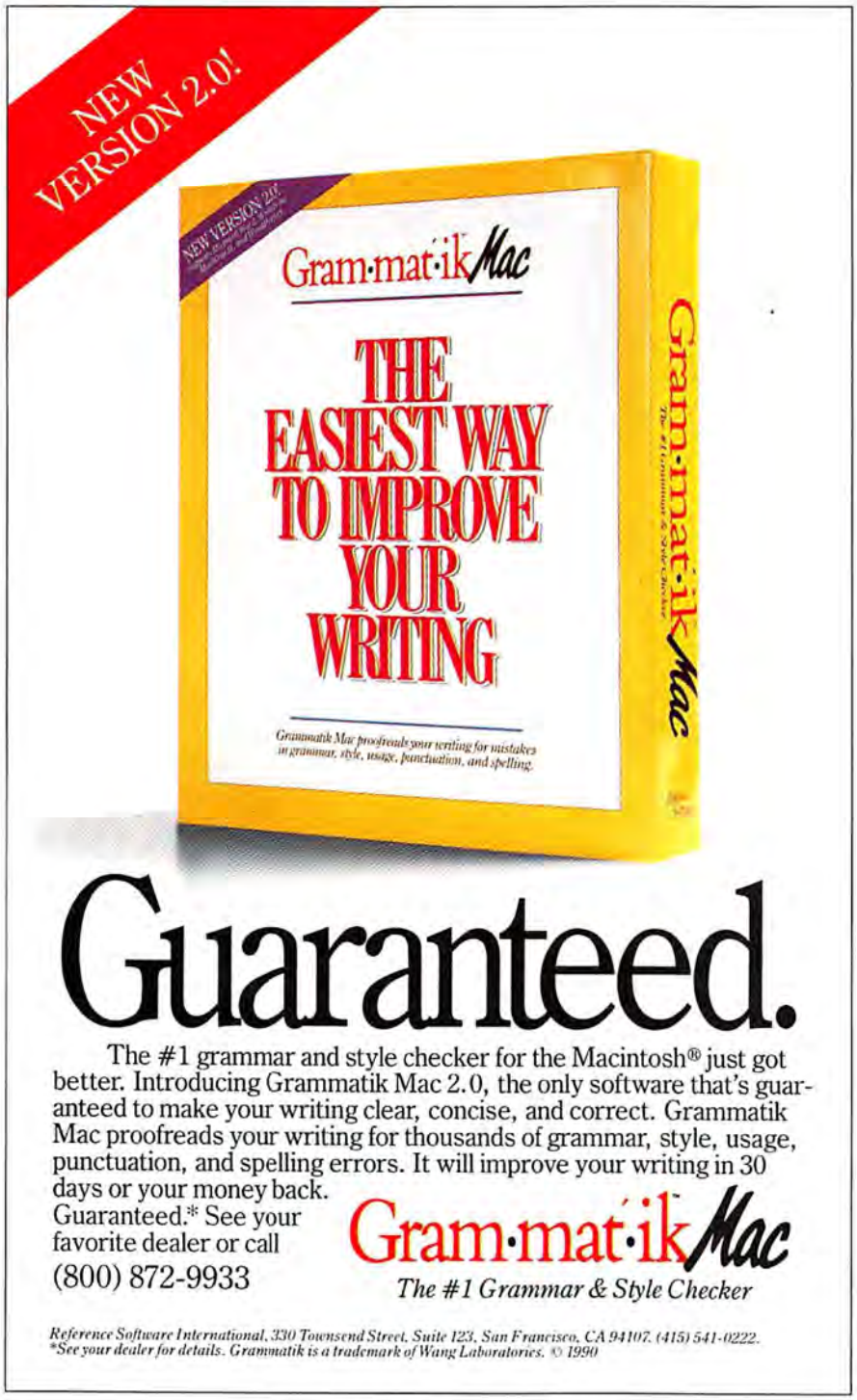
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two years in earlier versions of the program! That's like finding out that Excel 2.2 can't print a spreadsheet created in Excel 2.0! When I called the technical-support people about this problem, they recommended I hand-transfer the notes into the appropriate C•A•T III report templates. Two years' worth of work? Ludicrous.

Although I must commend the programmers at Chang Labs for the improvements they made to C•A•T III (better word-processing functions, pop-up menus, and so on), ultimately the program fails to deliver the speed, ease of use, and user-friendly documentation found in version 2.0.

Sam White
Port Washington, NY



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Optical Media Tour

John Rizzo's review of optical disc drives ("Erasable Optical Drives," November '90, page 102) contained one sentence that really caught my eye: "ISO-compliant Sony, Ricoh, and Maxtor mechanisms can all read each other's cartridges."

According to my experience, this couldn't be further from the truth. I've spent four months testing various magneto-optical drives from companies including Ricoh, Sony, and Maxoptics (Maxtor). I've found that the Ricoh drive can read only Mitsubishi and 3M media, and the Sony and Maxoptics can read only their own media. I also have media from PDO and Tosoh, but those can't be read by any of these three drives, even though PDO makes the media for Maxoptics.

Unless some major changes were to take place, or if you used different media than I did, the issue of compatibility and proprietary media will continue to be a major one.

Sean Ward
Encinitas, CA

It's not the media that are your problem but the way they're formatted. We ran the same media on Sony, Ricoh, and Maxoptics drives with good results. Some vendors whose implementation of the ISO formatting standard is not up to snuff will have compatibility problems. Although the MacinStor (Maxoptics) 650-megabyte format follows the spec, the 1-gigabyte format doesn't follow the standard at all and is not compatible with other drives. — JR

Foo's Rush In

I disagree with Scott Forbes' explanation of the origin of the generic term *foo* for a function (Letters, October '90, page 21). Obviously, a model function name should begin with the letter *f* to signify that it's a function, and I've always assumed that the nonsense word *foo* was chosen as a nod to Bill Homan's comic strip "Smokey Stover." After all, the word is always spelled *foo*, not *fu* (as in *FUBAR*), and I have never seen *bar* used

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as a function name (although I have seen *goo*).

Phil Miller
St. Paul, MN

We would dearly love to reproduce the "Smokey Stover" cartoon that Mr. Miller enclosed (which does indeed include the word foo *in various locations), but we're still smarting from the time we accidentally ran some Calvin and Hobbes icons. Interested readers are referred to page 286 of* Great Comics, *which was edited by Herb Galevitz (Crown Publishing). —JB*

Fuzzy Logic

What marvelous technological breakthrough brought us the fine quality of the little pictures of your columnists (November '90)? Did you have them lie down on a scanner and modem the result back to the office?

Daniel A. Koblosh
Redondo Beach, CA

The technical term for the process is FUBAR. —JB

Tech'ed Off

I read with interest Thom Hogan's "How to Get Tech Support" column (November '90, page 253). I have often been the victim of software companies that brag about their great on-line technical help that turns out to be technical "nonhelp."

Write letters, Hogan recommends. To be sure, I have written letters to address software problems — as many software companies would be willing to attest. Usually, however, even these do not help until the last paragraph, where I state that my next step is to communicate these software problems to all Mac users by addressing letters of criticism to all Mac-oriented publications.

As for the "technical" manuals provided with most software, almost all of them are unintelligible, because they're apparently written by individuals who have absolutely no interest in communicating information.

Perhaps Hogan would consider writing an essay that would be directed to all the technicians who work in his community. In it he could suggest methods that they could employ to provide the technical assistance that users need. Then the users will cease to be the victims in this situation!

J. Michael Yeager
Waterford, CT

Weenie Boast

In response to John C. Dvorak's "Weenie Computers" article (November '90, page 348), I would say he missed the point entirely. There *is* such a thing as a home computer, and I have had three of them.

My first "weenie computer" was a Commodore VIC-20 that I bought in 1982. It may have had only 3K of available memory to work with, but it was the most



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affordable computer you could buy. It offered color graphics, music, sound, and a price you couldn't beat.

My second and third weenies were the Commodore 64s Dvorak mentioned in his article. Weenie computer — are you kidding?!? This computer had 38K of RAM to work with, which is plenty when you're programming in BASIC. With it you had complete control of 16-color, high-resolution graphics and a three-voice, eight-octave music synthesizer. All with a price tag that was less than $500.

Now I use a Macintosh. I don't even own it — it's too expensive. I use the SE that Dad brought home from work (I'm 14). Now this is a weenie computer if there ever was one. Not that I don't like it — I love it. But I don't see how this computer can cost $2,000. And that doesn't include the hard drive, FDHD, or the keyboard!

Jason Gosnell
Maryville, TN

John C. Dvorak states that the market for home computers has not been established. With this I will agree, but the reason the market has not been established is that sufficient attention hasn't been given to encouraging and assisting those who would benefit from the use of home computers. A good market survey would find out what home users want.

Too little attention has been given to developing useful programs that would be attractive for those who use home computers. I am referring not only to those who have small home businesses but also to those who are interested in keeping their personal records in order and easily available. Why doesn't a company include several basic applications on one disk (or include them on a small hard drive)?

Joseph Ringers
Charlottesville, VA

Bundling several basic applications at a bargain price is a good idea, and T/Maker is doing exactly that with its SmartBundle package. For $349, you get WriteNow 2.2, SuperPaint 2.0, RecordHolderPlus 3.1, and Full Impact 1.1. — JB

Clarifications

"Clip Artistry" (November '90, page 168) listed some incorrect addresses and an incorrect price. The correct contact information for Dream Maker Software is 7217 Foothill Blvd., Tujunga, CA 91042; (818) 353-2297.

Dubl-Click's address is 9316 Deering Avenue, Chatsworth, CA 91311; its phone number is (818) 700-9525.

The correct price for Image Club's ArtRoom CD-ROM disc is $799.

The second line of code for Example 7 in "14 Excel Solutions" (November '90, page 233) is missing a character. The correct code is:

```
+SUM (MINUTE (A1 :A3))/60)
```


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JON ZILBER

Of Mice and Menaces



The *MacUser* mice are our own army of Good Mousekeeping Seals of Approval. Like any army, they have the power to serve and protect — and the power to mislead and misdirect.

You've probably got your own name for them. We call them the mice, the mouses, the meeses, the whiskered wonders, the wascally wodents. I'm talking about the mouse dingbats that grace every *MacUser* review, of course. They number anywhere up to five mice in a litter, in increments of half a mouse, depending on how strongly our editors and lab staff recommend a product.

Over the years, we've awarded literally thousands of mice to Mac-product vendors. Whatever you call the little critters, they're undoubtedly the best known vermin in all of computerdom (aside from the legion of actual Mac mice themselves), and we're mighty proud of them.

But sometimes we — as someone once said — hates meeses to pieces.

For starters, there's the issue of the half mouse: What do you do to graphically show half a mouse? Do you slice it in half — and if so, do you dissect it vertically or horizontally? (To avoid the wrath of dingbat anti-vivisectionists, we have opted for a one-half fraction instead, although we admire the aplomb of several vendors who have used a variety of shockingly explicit half-mice in their advertisements.)

Then there's the grammar question: Is it a four-*mice* product or a four-*mouser?*

I won't even mention the typographic hassles of getting the special mouse character to print — with proper kerning, leading, and wrapping — in our (and our vendors') DTP systems. Ever try to kern a mouse?

Don't forget the aesthetic issue: Do we stick with our more-or-less zoologically correct animal or switch to a representation of a mechanical mouse?

All of these are insignificant compared with the real issue: Is it meaningful and fair to slap a single numerical rating on complex, multifaceted hardware and software products?

It's a question that comes up like clockwork at our editorial-staff meetings. It tends to be triggered by vehement letters and phone calls from vendors or users of products that have recently received a relatively reduced rodent rating.

There's a mathematical trusim at work here. In any comparative review of a group of products, 50 percent of the products score in the top half and 50 percent are rated below the median. (Guess which half send the letters and make the phone calls)

It's not that we're shy about calling the shots — it's that we're shooting at a moving target. That target has three concentric circles: the universe of competing products, the capabilities of the Mac itself, and — the bull's-eye — the wants and needs of all our readers.

The Meaning of Mice

As the universe of Mac products expands, our ratings guidelines adapt accordingly. For example, copy-protecting application software used to cost products a full mouse. Today, although copy protection hasn't vanished off the face of the planet, it's generally done in unobtrusive and appropriate ways, so we no longer enforce an automatic "protect the disk and lose a mouse" policy. (As with any feature, however, if the copy-protection scheme is implemented in an awkward way, the product's rating can suffer.)

The passage of time tends to nibble away at mice ratings. Because the state of the art is continually improving, we go through our MiniFinders database of mouse-rated products regularly and downgrade products that haven't kept up with the times — and the competition. When these products are upgraded, the ratings are reviewed once again.

Occasionally we change product ratings because the installed base of Macintosh users (and *MacUser* readers) is changing. For example, a product whose sole benefit is that it works on a 128K Mac no longer wins Brownie points from our reviewers. (Sympathy and sentimental gratitude, yes, but Brownie points or mice, no.) Likewise, products are no longer rewarded merely for using color or for being fully Mac II-compatible, which was a big deal not so long ago.

See How They Run

The majority of the products we test and review are good, solid, quality products, and the differences in mouse ratings are based on an analysis of how a product fares against the competition. Most products are part of a pool of products aimed at similar users with similar budgets in similar markets.

That's why we've turned to a lab-based testing methodology for the majority of our reviews, particularly in the case of hardware. When the differences are measurable and objective, that review process and the meaning of the mouse ratings are straightforward.

It's no coincidence that more than half the products in our lab reports usually rate higher

than the three-mouse rating you might expect to be the median score. If everybody's doing their job right, developers are putting their best efforts into the same hot product areas that MacUser Labs is investigating.

When a product mouses poorly, it's generally for one of two reasons: It's seriously flawed (or inferior to a comparably priced, similarly designed competitor), or the product is fine for a very, very specific type of user but certain aspects of its design — the interface, the feature set, the hardware requirements, and so on — render it unsuitable for a mass audience.

In other words, lower ratings don't always mean lower quality. What they often mean is that although a product is nicely suited for some users, it's the wrong choice for most.

A good review takes into account who will be using the product; the review can't and shouldn't be written in a vacuum. For example, in the pre-Mac II days, any product that tried to do heavy number-crunching or anything that required processor- or memory-intensive calculations was crippled by pathetically slow performance, and the tone of many reviews was along these lines: "Nice idea, but just too sophisticated for the Mac."

With the arrival of the Mac II and beyond, the pendulum swung to the other extreme. An attitude of "Nice idea, but wastes the awesome power of the Mac" infiltrated many reviews. If an app didn't blow away all your friends with 386s and Windows, it wasn't worth the time of day. Apple had leapfrogged from making the computer for the rest of us (read: computer illiterates afraid of character-based interfaces who just needed to balance their checkbooks, file their recipes, and doodle new logos in MacPaint) to making the computer for the best of us (read: power-mad computer jocks), and our reviews echoed that shift in sensibilities.

With the arrival of the new low-cost CPUs, Apple's product line finally has all the price points needed to interest both ends of the spectrum — from the under-$1,000 Mac Classic for the casual user to the IIfx workstation that often runs deep into five digits for the power user. That makes it tougher for one mouse rating to cover all possible situations.

Take the categories of graphics software, for example. If you have a IIfx equipped with a color scanner, printer, and monitor, and you're geared up to do high-end prepress work, you've made a substantial investment in hardware that you're probably prepared to supplement with a reasonable investment in software. And most likely you're willing to spend some time with the software, learning the ins and outs of several programs, each one optimized for a different step in your process or a different nuance in the result you're aiming for.

On the other hand, if you're a graphic artist who's just picked up a Mac Classic,

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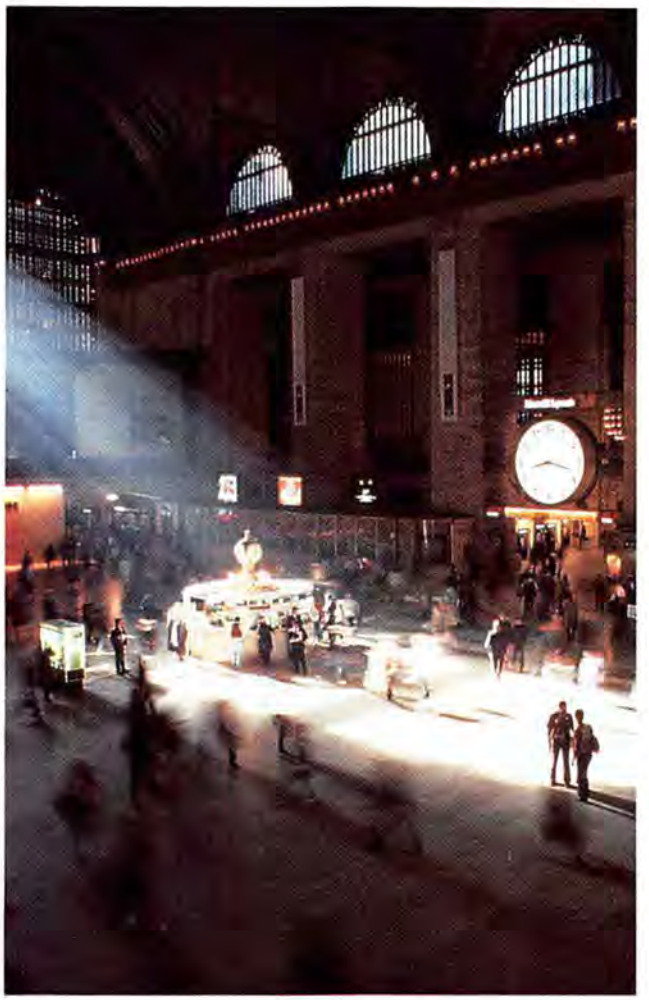
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hard disk, and printer for well under $2,000 total, the thought of spending more than a few hundred dollars on software is enough to lead you to thoughts of piracy.

Because we can give only one rating, we have to make some assumptions about what kind of hardware you have, what your pet peeves are, what features get you excited, and so on. Our research department does all kinds of surveys and market studies to find out precisely what kind of Mac user reads *MacUser*. But at the end of the day — and at the end of the review — we have to rely on instinct about who you really are and what you want.

Let's get back to those two graphic artists. One of them is going to buy an entire library of software — perhaps Photoshop, Illustrator, TypeStyler, Metamorphosis, MacDraw II, PixelPaint Pro, and Swivel 3D, for starters — that's going to cost more than the other artist's hardware setup. The other person is looking for one product that does it all (or at least most of it) and doesn't cost an arm and a leg — an UltraPaint or DeskPaint/DeskDraw. Both users are going to have to read the same reviews, and the same mouse ratings, for each of these products.

Escaping the Mouse Trap

You really need to look beyond the mice to decide which product is best for you. And although we sometimes like to feel that we're the last word on the subject, we encourage you to check out other sources of information about the products you're interested in; seek out word of mouth to complement word of mouse.

Read the ads; send in the reader-response card for the vendor's literature; ask questions on bulletin-board services or at user-group meetings about other people's experiences; and send for demo disks, or visit your local Mac product dealer for hands-on experience. And read this month's "Buying Smart" for more tips on how to go beyond a review or a rating to make sure your software and hardware dollars are buying all they can.

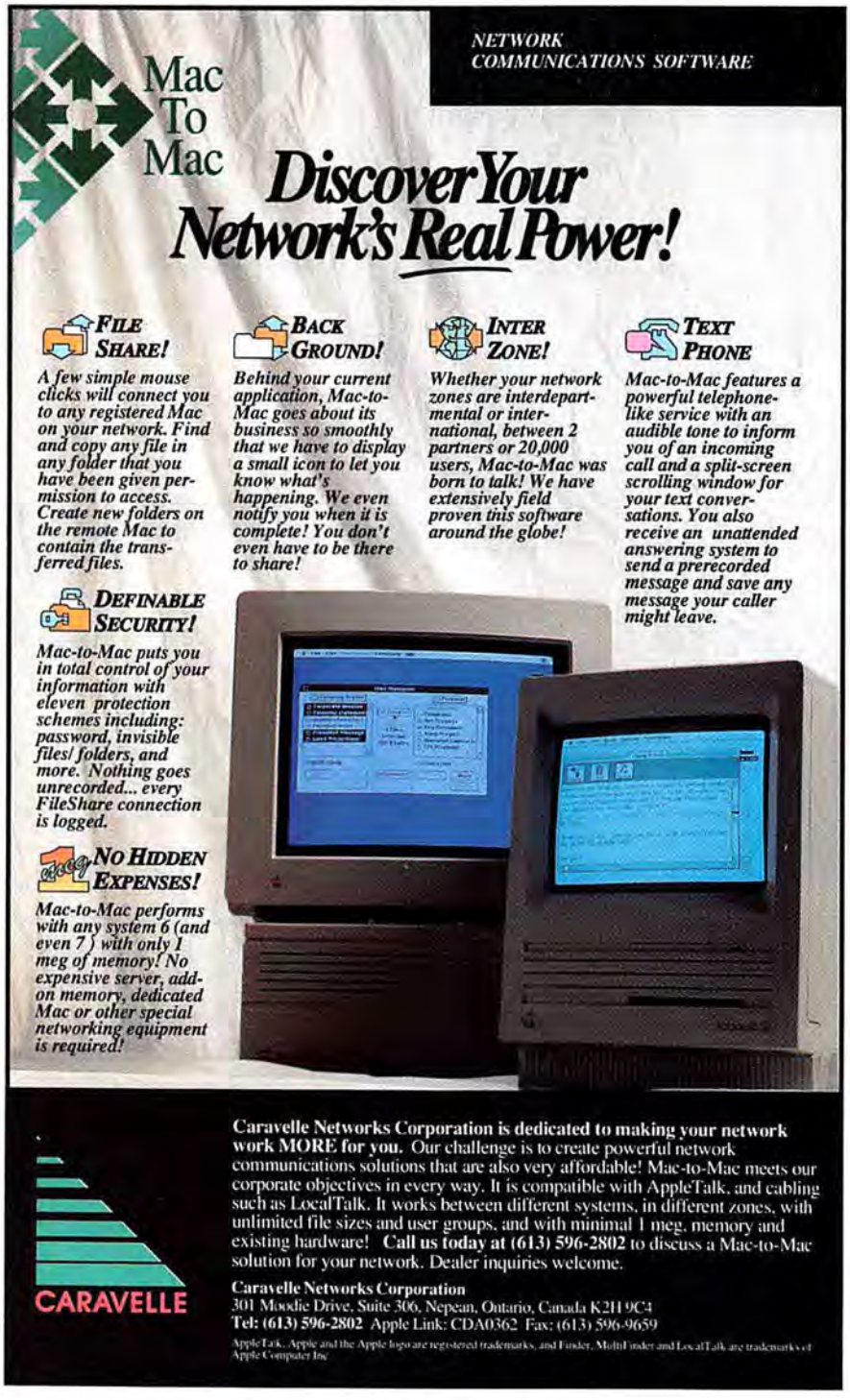
But while the mice can't possibly tell the whole story, they're a good place to start — once you know what they mean.

A Mouse Manifesto

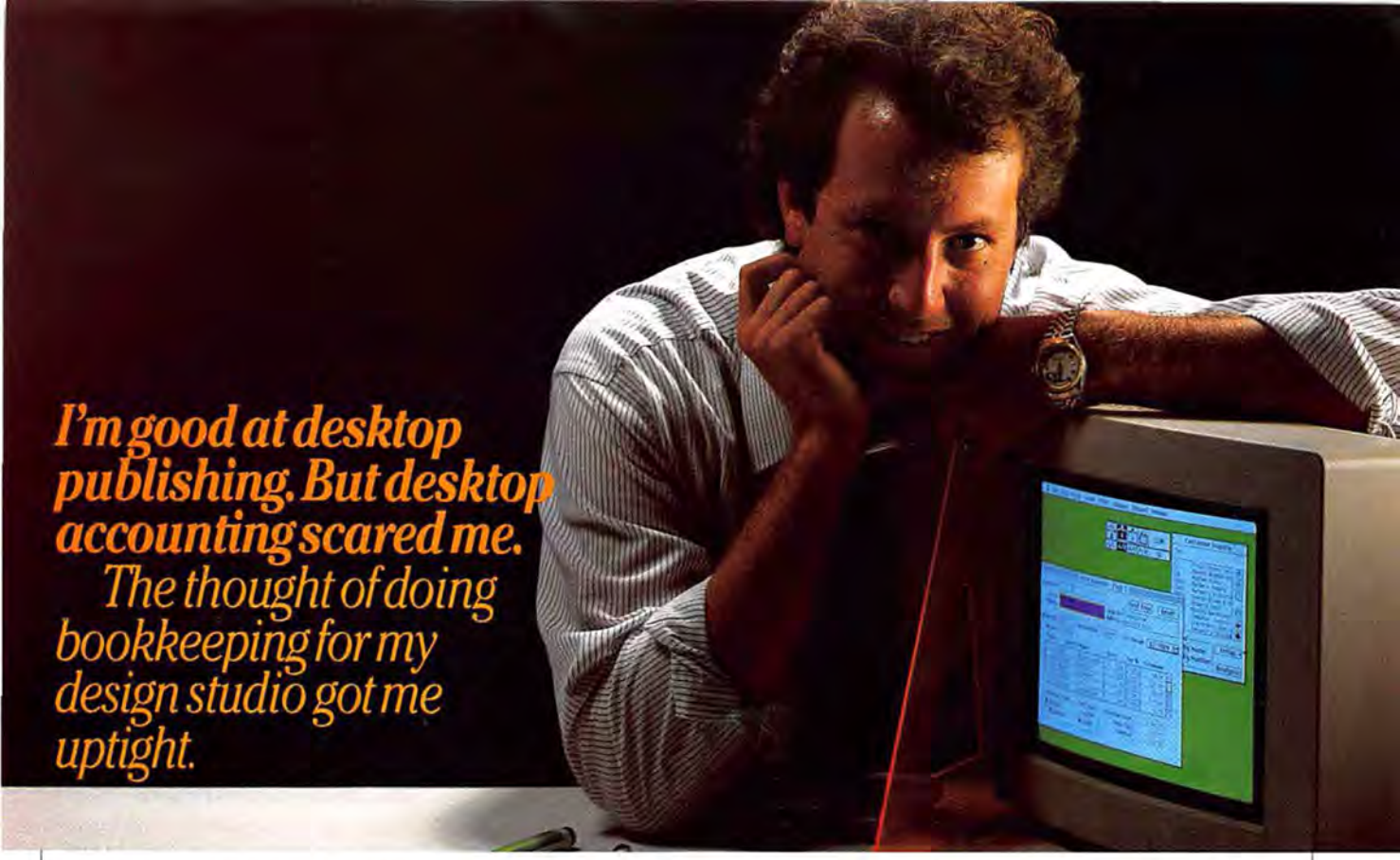
A five-mouse product belongs on the desktop of virtually every *MacUser* reader. Five mice means that all users who can imagine a way they'd use that product won't be disappointed when they make the necessary investment in time and money. A five-mouser is probably worth buying even if you don't yet know what you'd do with it.

Four and a half mice means that the product suffers from at least one significant flaw or missing feature or that there's at least one competitor that implements at least one feature better — or costs less.

Four mice means you should seriously consider this product as you evaluate your options. Most four-mousers are



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I'm good at desktop publishing. But desktop accounting scared me.

The thought of doing bookkeeping for my design studio got me uptight.

When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books.

No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.



And deadbeats to collect from–only I had no idea who owed us how much or for how long. Some suppliers may have even thought of *us* as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

The familiar with the unfamiliar

atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices–and atOnce! calculated sales tax. Nice. Printed the invoices which I redesigned in atOnce!–realign a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

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What I didn't know was costing my company

I discovered a key client who hadn't paid in two months. I called and collected and now *he* wants to know about atOnce! I wrote payroll checks for the staff, and sent our bank a balance sheet I printed out myself–no sweat.



From fear and loathing to passion. Now I even study the management reports atOnce! generates.

I'm still an art director. But atOnce! helped me become a better businessman!

A hidden bonus that made my day

When our bookkeeper returned, I showed her atOnce! Now she's back doing the books, even makes sure my plants are green, and I can supervise like a boss should. Putting the books on the Mac gives me the numbers I need when I want them. It lets me take control of income and expenses.

Here's some free advice: Take control of your *own* business. Buy atOnce!



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completely satisfactory for most users. They have room for improvement in some areas, but they're probably not mission-critical features.

Three mice: A solid product, but check the specs carefully to make sure it does everything you need or that it shrinks the price tag enough to make up for what it lacks; a three-mouser may offer a bit less for a lot less. (Three-and-a-half-micers typically have an extra something to recommend them.)

Two mice: Watch out for this product. It may have anything from some severe bugs (bugs and mice are natural enemies), a confusing interface, and poor technical support to an exorbitant price.

One mouse: You may have noticed that *MacUser* doesn't run many reviews of one-mouse products. We'd rather use the space to tell you about products that are worth reading about. But if a one-mouser falls within the scope of a comparative lab report — or if we think it's important to warn you about a product's flaws — you'll see a lone mouse to ward you off.

When a product is beneath contempt even for the *MacUser* rat pack, we award a no-mouse bomb rating. Only a handful of products have ever had a bomb dropped on them throughout *MacUser*'s history.

Resolutions and Revolutions

Last month I promised to say more about the revolution taking place in the changing realm of spreadsheets. Which means I've already broken my New Year's resolution not to promise today what I can't deliver until next month. But I did want to share a few other resolutions — ones I hope you'll adopt for yourself.

Resolution: Let software publishers know you're not impressed when they bulk up their packaging so that a disk and a small manual come in a box that's bigger than a bread box, thanks to all the styrofoam, plastic, and other non-recyclable filler.

Resolution: Let the mail-order companies that adopt environmentally sound shipping practices know you appreciate their concerns. (After MacConnection announced that it had stopped using Styrofoam "peanuts" in its packing materials, Mac's Place announced that it would ship all products in — honest — popcorn.)

Resolution: Use E-mail instead of paper mail and memos whenever possible. It's faster and easier, and electrons are 100-percent recyclable. Become a pixel pusher instead of a paper pusher.

Resolution: If you want to write to point out that *MacUser* is a paper product (occasionally shrink-wrapped in plastic) that ought to clean up its own act, do it electronically; post your comments in the Editors On Line section (section 7) in the MacUser forum on Zmac. (If you're a CompuServe subscriber, just type GO ZMAC at any ! prompt. If you're not, look for information on how to sign up elsewhere in this issue.)



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Text for the menu was created in PageMaker, saved as EPS files and placed in FreeHand.

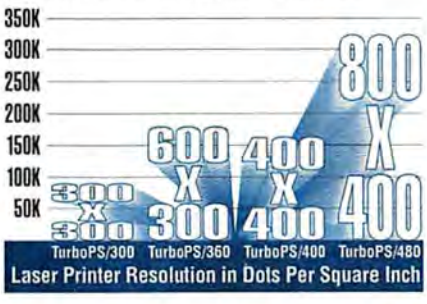
The Images with Impact® clip art illustrations were edited with FreeHand and color was specified in cyan, yellow, magenta and black.

The Apollo logo was created in FreeHand where the various elements were edited and combined.

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The NewGen TurboPS/480 can produce PostScript® language compatible output at 800 x 400 dpi, nearly four times the resolution of other laser printers. And when we say PostScript compatible, we mean it, including Type 1 fonts, special effects and EPS files from all your favorite applications and programs.

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Resolution close up, 18 point Garamond Italic enlarged 500%



300 x 300 dpi	800 x 400 dpi	600 x 600 dpi
LaserWriter II	NewGen PS/480	Varityper VT-600

To show you how confident we are that you'll be impressed with 800 x 400 dpi output, we printed this page at actual size, including the menu which was output as color separations.

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Dealer inquiries welcome.



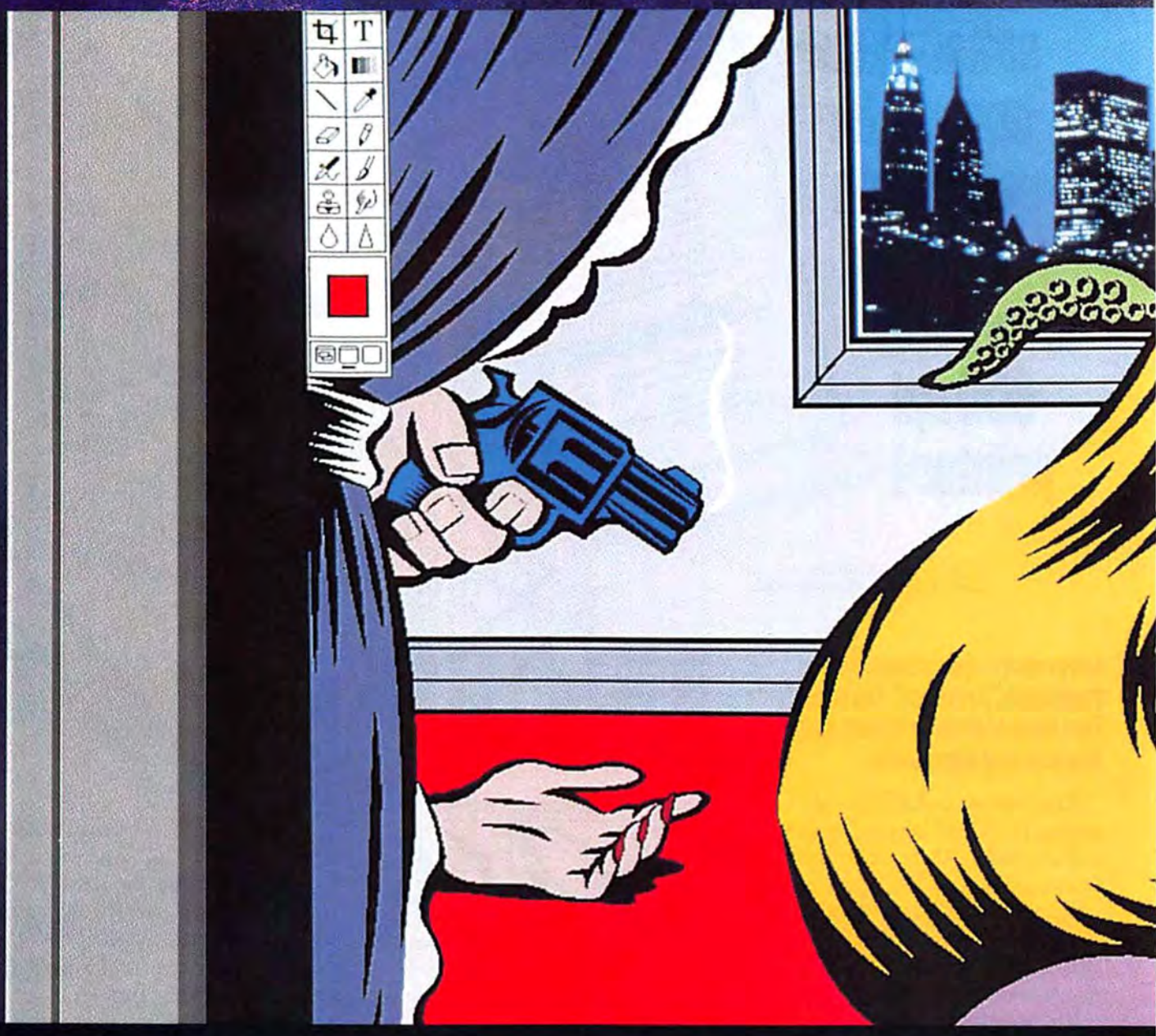
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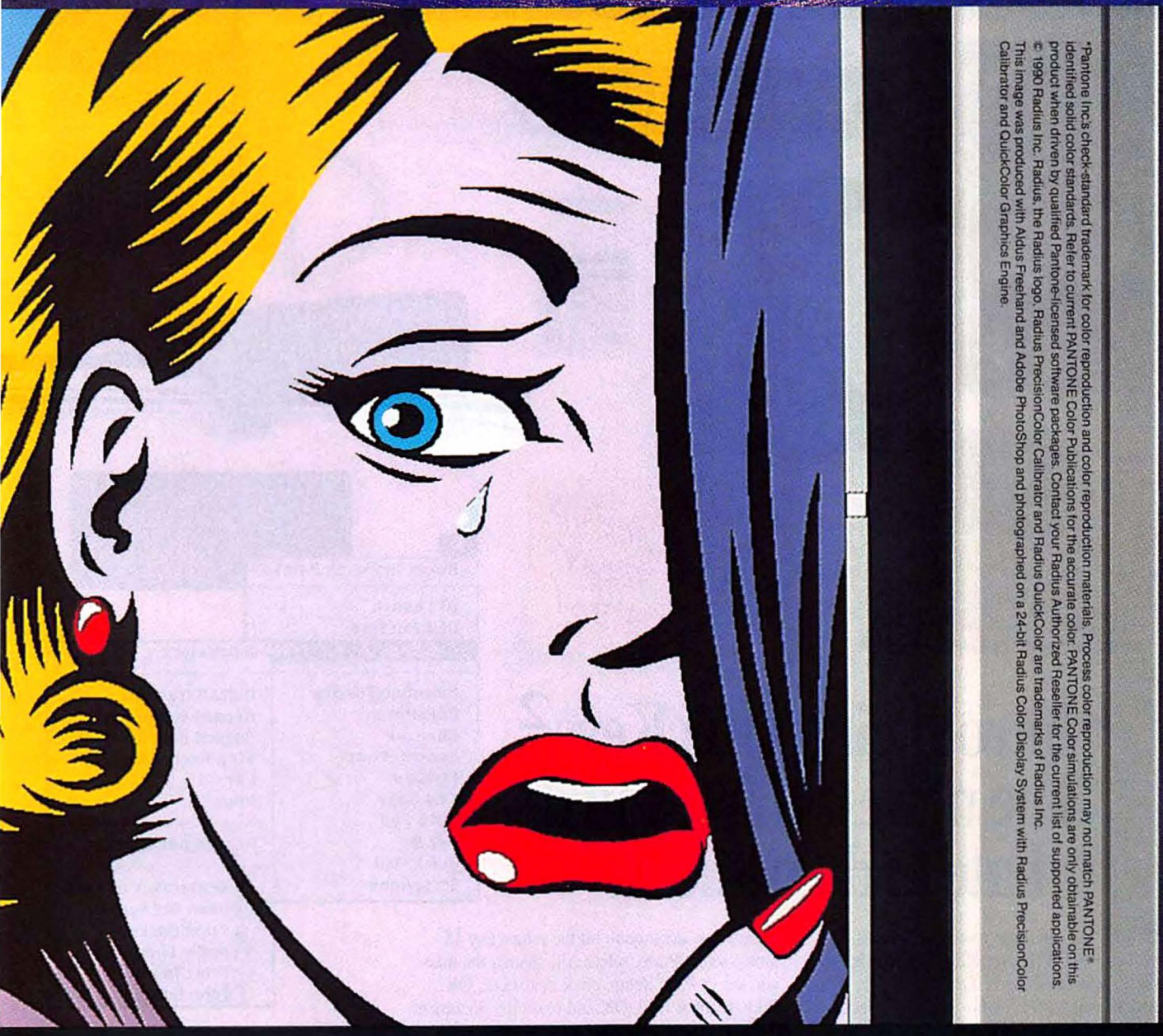
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He didn't want just any colors. No, that wouldn't do. They had to be perfect. PANTONE®* perfect. His color monitor was a limitation. He knew that. ● Then along came this thing called Radius. It had colors down cold. The colors he saw on his display were the colors he got. A special Precision-Color™ Calibrator made certain of that. When his proofs got back from the printer, there weren't any surprises. He hated surprises. He hated gunplay, too. ● Now he had more time for his passion. No, not Brenda. Color.

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This image was produced with Aldus Freehand and Adobe PhotoShop and photographed on a 24-bit Radius Color Display System with Radius PrecisionColor Calibrator and QuickColor Graphics Engine.

From Her Big Process Blue. Her Skin Went Pantone 263."

He had a big 19" display and his choice of 8, 16, or 24-bit color. He chose 24. He also went with QuickColor,™ a graphics engine that allowed his screen to fill and scroll up to six times faster. ● That was good. It was all good. Except for Brenda's evil twin. He was gonna fix her, all right. Make her hair gray. Turn her lips purple. He wasn't sure, but he was gonna get that dame. ● For your nearest Radius reseller, or for a color systems brochure, call 1-800-227-2795. In Canada, call 1-416-738-3920.



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ROBERT WIGGINS

Instability Index



Sometimes it just seems as if the Mac is architected for reduced stability.

It's hard to believe, but the Mac is seven years old this month. And although today's Macs seem far removed from the lowly 128K Mac of 1984, there are more commonalities than differences. The Mac interface is standing the test of time, so much so that even DOS diehards are looking at GUIs (graphical user interfaces) and Steve Jobs' brazen prediction that the Mac would become the "third standard" after the Apple II and the IBM PC has come true.

Seven years ago, the business marketplace laughed at the Mac, dismissing it as a toy. Only 128K of memory? No hard-disk drive? No expansion capabilities? No SCSI or other bus? When the Mac Plus appeared in 1986, it put a lot of these objections to rest with its 1 megabyte of memory (upgradable to 4 megabytes) and a SCSI bus for hard-disk drives and other expansion hardware. The Mac even got its own built-in network, AppleTalk, and an incredible laser printer that was reason enough for some business users to switch from DOS. Every model introduced since then has further demonstrated the power and flexibility of the Mac architecture.

After seven years of continual improvement and refinement, with more new and exciting changes looming on the horizon, the Mac has finally gained the widespread acceptance as a business computer that this column, for example, has been claiming was its due since 1985. But is the Mac the business machine for everyone? Or is it possible that some applications just weren't meant to go the Macintosh way?

For mainstream business applications, there's little doubt that the Mac is at least as good as any other platform and is in many ways superior. Why else would other machines be aiming GUIs at the Mac in self-defense? For word-processing, spreadsheet, and desktop-publishing applications, the Mac interface is liberating for many people, unleashing their creativity when a mouse is put into their hands. You may have noticed that the major Mac applications are also available for the IBM PC and sell well on both sides.

But in the database arena, the Mac has both passed the PC and been left behind. Relational databases such as Double Helix II and 4th Dimension have given Mac business users incredible power, but no single Mac database program has become the driving force that dBASE is on the PC side. Yes, many developers are using Double Helix II, 4D, and other Mac database programs to create custom applications (and some very powerful and attractive ones, at that), but the kind of critical mass that dBASE has achieved on the PC has stayed out of reach.

The consistent Mac interface has also served as a barrier to market entry for many smaller firms that develop vertical-market software. When your expertise is primarily industry-specific and programming is only secondary, facing the Mac can be quite daunting. Programmers who are experienced on other platforms face a significant learning curve when moving to the Mac, because they are responsible for doing all the necessary work to make the product easy to use for the consumer, which is the Macintosh way of doing things. As a result, many companies in specific markets end up with IBM PCs, as the software for their industry is limited (if it's available at all) on the Mac.

Even if the software you need to run your business is available for Macs, there's the stability problem. As fast and hard as Apple works to make the Mac OS (operating system) rock-solid, third-party developers work even faster to make interesting and often powerful changes to the OS. These modifications can make life with the Mac easier or more fun, but almost every one of these changes increases the probability of instability. And when Apple introduces major changes to the OS, such as System 7.0, the stability gap can become a vast chasm.

The one thing users who depend on their Macs to run a business can't tolerate is increased instability. Sometimes it seems as if the Mac is architected for reduced stability. It's not, of course — quite the contrary — but when a system bomb or freeze-up trashes valuable business data — even if it can be retrieved — the pain can be major.

There are strategies you can follow to reduce your vulnerability to instability problems. Although it seems that this column tosses them up every few months, they're worth repeating again and again. Some people have to endure the agony of re-creating a week's worth of transactions before they pay attention to preventive measures, but you don't have to suffer to clean up your act.

Back up your data. Incremental backups, easily accomplished with packages such as Redux or Diskfit, can reduce the onerousness of the task. Even better, archive your data so you have multiple generations of backups.



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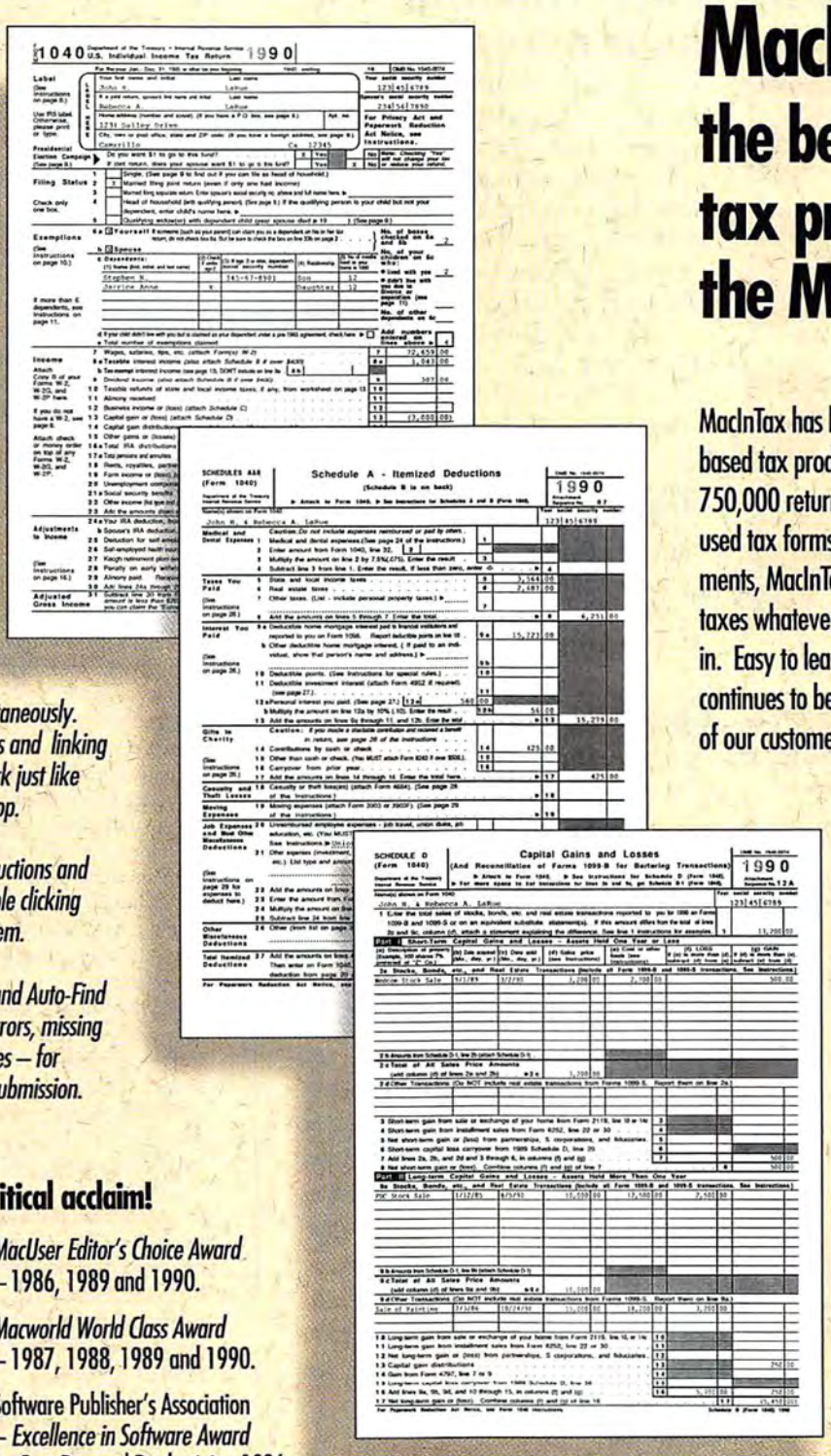
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You can do this with a backup program and multiple separate backup sets or get a true archiver such as Retrospect, an incremental-archiving program.

Try to avoid those sexy little utilities that can be the source of great pain as well as great pleasure. Every little INIT icon that marches across your screen at startup increases your potential instability index. Yes, they can be wonderful, but too much of a good thing isn't always the best idea. Does having a color cursor really make you more productive? Look at the benefits you get from your INITs and cdevs, and weigh them against the potential cost of the problems they can cause.

When you do have your system running smoothly and everything seems stable, don't make changes. Apple's new System versions always fix bugs, but if you're not experiencing any bugs, don't blindly upgrade — new versions can introduce new bugs. In other words, if ain't broke, don't fix it. This especially applies to major new versions such as System 7.0. Let other people be the pioneers. This strategy also applies to software upgrades, especially major new versions with lots of new features. Wait not only to see if others have problems but also to find a time in your work schedule when you can spend extra time learning the new features.

If you do have smoothly functioning systems on other platforms or you're running programs on mainframes, think long and hard about converting them to the Mac. When you first use the Mac interface, it's hard not to imagine converting all your data to the Mac, but there are some things that mainframes (or other platforms) can do better, such as manage large-scale databases with high levels of recovery that make losing data almost impossible. Database recovery on the Mac is in the Stone Age compared with mainframe databases, so keep your data where it's safest.

The Mac is a business computer, but it's not the only business computer. Recognize that different systems have different strengths and weaknesses, and look at your computing needs from a company perspective. You should find that the Mac has a place in your business, but it may not be alone. And when you're making plans for your Macs, remember the potential instability index and use some diligence to make sure your valuable company data is adequately protected and not needlessly at risk.

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7129 Accountant, Inc. Professional 1.0 . 345.
Softview
3470 MacInTax 59.
★Software Discoveries ... 30 day MBG
8118 RecordHolder Plus..... 85.
★Spinnaker ... 30 day MBG
6508 The Resume Kit 35.
★Survivor Software ... 30 day MBG
6097 InvoicIt 1.01 *(reqs. MacMoney)*.... 49.
3289 MacMoney 3.5..... 59.
★Symantec ... 30 day MBG
3422 More 3.0..... 265.
★Symmetry ... 30 day MBG
4504 Acta Advantage 1.02 63.
6069 KeyPlan 1.0 243.
★Synergy ... 30 day MBG
6617 KaleidaGraph 2.1 145.
★Systat, Inc. ... 30 day MBG
7410 Systat 5.0 599.
★Teleware ... 30 day MBG
7616 M.Y.O.B. 2.0..... 145.
★TIMESLIPS ... 30 day MBG
2986 Timeslips III 2.0..... 195.
★T/Maker ... 30 day MBG
7923 WriteNow 2.2/Grammatik Mac.... 117.
8206 SmartBundle..... 215.
★WordPerfect ... 60 day MBG
3800 WordPerfect Mac 1.0.5..... 229.
★Zedcor ... 60 day MBG
6742 Desk 1.0..... 229.

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★Aapps ... 30 day MBG
7117 DigiVideo 1.0 *(black & white)* 398.
7114 DigiVideo Color 639.
★Abbott Systems ... 30 day MBG
8052 Cheshire 1.0..... 63.
Adobe Systems
Adobe Type Library call
6957 Adobe Type Reunion 1.0..... 38.
5750 Adobe Type Manager 2.0..... 55.
6053 Adobe Plus Pack..... 109.
6156 Adobe Plus Pack/ATM..... 159.
6098 TypeAlign for ATM 1.0..... 59.
6985 Adobe ATM/TypeAlign Pack 89.
Adobe Type Set 1, 2 or 3..... call
8042 Adobe Type Sets 1-2-3 Bundle ... 199.
1137 Adobe Illustrator 3.0 349.



Adobe Systems
1137 *Illustrator 3.0*–Direct, on-screen entering & manipulation of text. Control every aspect of the characters, including kerning, text on a corner & more. Currently bundled with ATM 2.0 . $349.
5750 *Adobe Type Manager 2.0* 55.

6644 Adobe Photoshop 1.0..... 499.
5605 TrueForm 2.1 225.
5001 StreamLine 1.2..... 225.
Smart Art I, II, III, or IV *ea.* 59.
★Aldus/Silicon Beach ... 30 day MBG
3506 SuperPaint 2.0 135.
3980 Digital Darkroom 1.1..... 259.
3507 Super3D 2.1..... 339.
Persuasion, PrePrint or FreeHand *ea.* 329.
7088 PageMaker 4.0..... 499.
8054 Design Team *(PM, FH & PrePrint)* . 889.
Altsys
5425 Art Importer 2.0 85.
6499 Metamorphosis 1.5..... 85.
1195 Fontographer 3.1 249.
★Baseline Publishing ... 30 day MBG
7784 Color MacCheese 1.05..... 57.



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6281 TypeStyler 1.5 115.

★CE Software ... 60 day MBG

7481 Amazing Paint 1.0 65.

Claris

1123 MacPaint II 2.0 92.
1117 MacDraw II 1.1 289.
8007 Claris CAD 2.0 649.

Computer Associates/Cricket

1668 CA-Cricket Graph 1.3.2 119.

★Creative Software ... 30 day MBG

6645 Easy Color Paint 2.0 45.

★Custom Applications ... 30 day MBG

8037 Freedom of Press Light *(17 fonts)* . . 56.
6517 Freedom of Press 3.0 255.

★DeltaPoint ... 60 day MBG

6095 DeltaGraph 1.5 109.

★Deneba Software ... 30 day MBG

6365 UltraPaint 1.0 125.
1769 Canvas 2.1 189.

★Design Science ... 30 day MBG

8205 Parafont 59.

★Dream Maker ... 30 day MBG

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8251 *Icon It!*–Quickly creates custom icons for all applications. $45.

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7684 Cliptures: Sports 3 69.

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WetPaint Clip-Art *ea.* 42.

★Electronic Arts ... 30 day MBG

8056 Studio/32 449.

★Farallon Computing ... 30 day MBG

6770 MacRecorder Voice Digitizer. 89.
2199 MacRecorder Sound System 2.01. 159.

★Foundation Publishing ... 60 day MBG

6728 Comic Strip Factory 1.6 37.

★Generic Software ... 60 day MBG

7454 Generic CADD 1.0 375.

Innovative Data Design

2417 MacDraft 2.1. 279.
4707 Dreams 1.1. 319.

Letraset

2619 ImageStudio 1.5 139.
2621 Ready Set Go! 4.5A 165.
4709 LetraStudio 1.5. 275.
6300 FontStudio 1.0 359.
6301 ColorStudio 1.0 649.



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6929 *WealthBuilder 1.0*–Earn more, invest wisely & save effectively with WealthBuilder, your complete personal planning & investment system. Objective information on up to 1,200 mutual funds & 10,000 stocks & bonds . $145.

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5087 MacroMind Director 2.0 439.

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7714 Capture 3.0 45.

★MediaLab Tech. ... 30 day MBG

8218 Picture Link 225.

★MicroFrontier ... 30 day MBG

7886 ENHANCE 1.0.3 239.

★MicroMaps ... 30 day MBG

7554 MapArt *(Paint)*. 41.
MapArt *(EPS)* or MapArt *(PICT)*. . . . 99.

★Microsoft ... 30 day MBG

2878 PowerPoint 2.01 245.

PANTONE

7466 Process Color Imaging Guide. 49.

Paracomp

7421 DrawTools 1.0. 62.
7728 SwivelArt 1.0. 82.
4597 Swivel 3D 1.1 295.
7441 Swivel 3D Professional 1.0 439.
5028 Model Shop 1.1 375.
7839 FilmMaker 1.0. 439.



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6089 *Smart Alarms with Appointment Diary 3.0*–A Macintosh reminder and calendar system featuring: auto backup, variable snooze, multiple reminders, weekly and monthly views, and zoom. Multiple users available $63.

★Preferred Publishers ... 30 day MBG

7828 Exposure Pro 69.
8055 Screenshot 31.

Quark

7612 Quark XPress 3.0 529.

Softview

7499 if:X Forms Designer 1.0. 169.

★Solutions, Inc. ... 60 day MBG

3446 The Curator 1.05. 71.

★Springboard ... 30 day MBG

3530 Certificate Maker 2.0. 22.
4497 Top Honors 1.01 57.
4500 Springboard Publisher II 2.0 107.

Strata

7773 Stratavision 3D. 369.
7772 Stratavision 3D/Renderman Bundle. 999.

Strategic Mapping

6518 ATLAS • MapMaker 4.5 369.

★SuperMac Tech. ... 60 day MBG

5625 PixelPaint Professional 2.0 465.

★Symmetry ... 30 day MBG

8172 Mariah 1.0 94.

★Tactic Software ... 30 day MBG

8251 Icon It 45.
Magic Typist, Art Fonts, Sound Cups or Art Clips 1 *ea.* 50.
8281 Art Clips 2. 65.
8248 Font Share 129.

3G Graphics

3942 Images with Impact: Graphics 1 . . . 50.
4583 Images: Business 1 or Accents. . *ea.* 65.

★Timeworks ... 30 day MBG

7115 Publish It! *Easy* 2.0 145.
5908 Publish It! 1.2 222.

★T/Maker ... 30 day MBG

3633 ClickArt Christian Images 39.
7424 EPS Animals & Nature 82.

★Wildflower ... 30 day MBG

6512 SnapJot 2.0 32.

★Zedcor ... 60 day MBG

3986 DeskPaint & DeskDraw 3.0 115.

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5236 CanOpener 1.1 63.

★Advanced Software ... 30 day MBG

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7835 Tempo II Plus 105.
★Aladdin Systems ... 30 day MBG
6169 Shortcut 1.5 46.
7504 Programmer's Assistant 1.0 57.
6740 StuffIt Deluxe 1.1 63.
★Aldus/Silicon Beach ... 30 day MBG
5100 SuperCard 1.5 199.
★ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5 *(1 user)* . . 145.
★Baseline Publishing ... 30 day MBG
7783 INIT Manager 35.
★Berkeley Systems ... 30 day MBG
5737 After Dark 2.0 22.
1541 Stepping Out II 2.02 49.
★Bravo ... 30 day MBG
5404 SPAMM 1.1 48.
★Casady & Greene ... 60 day MBG
2269 QuickDEX 1.4D 34.
7443 A.M.E. 1.1 159.
★CE Software ... 60 day MBG
4689 MockPackage Plus Utilities 4.4 31.
1727 CalendarMaker 3.0 31.
6278 DiskTop 4.0 63.
7518 Alarming Events 1.0 85.
8024 QuicKeys 2.0 94.
★Central Point ... 30 day MBG
5040 Copy II Mac 7.2 23.
5041 Mac Tools Deluxe 1.0 75.
★Connectix ... 30 day MBG
7830 Maxima 1.0 89.
6123 Virtual 2.03 *(for SE/30, IIcx, IIx, & IIci)* 115.
6122 Virtual 2.02 *(for Mac II, incl. PMMU)* . 188.
★Dantz Development ... 30 day MBG
5255 Retrospect 1.2 148.
7945 Retrospect Remote 265.
7946 Remote *(10 Pack)* 148.
★Design Science ... 30 day MBG
7887 MathType 2.0 89.

★Digitalk ... 60 day MBG
5166 SmallTalk/V Mac 1.1 $124.
Dubl-Click Software
7974 ClickChange 41.
1824 Calculator Construction Set 2.05 . . . 45.
★Fifth Generation ... 30 day MBG
4287 PYRO! 4.0 *(screen saver)* 25.
3955 Suitcase II 1.2.6 49.
7700 File Director 1.0 82.
FastBack II 2.5 or DiskLock 2.0 . . . 118.
3383 SuperSpool 5.0 62.
3382 SuperLaserSpool 2.02 93.
3378 SuperLaserSpool 5-Pack 2.02 315.
★Foundation Publishing ... 60 day MBG
6701 HyperSpeller 1.0 29.
★HyperGlot ... 30 day MBG
8259 RefBase 1.0 105.
★Hyperpress Publishing ... 30 day MBG
4233 Icon Factory 1.0 45.



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7992 *DynoPage 1.0*–Prints any Macintosh file to personal-organizer pages. Just insert and go! . 57.

ICOM Simulations
4084 On Cue 1.3 35.
5681 HyperTMON 1.0 57.
4085 TMON 2.8.4 86.
Individual Software
Power Macros Excel or MS Word *ea.* 26.
4719 101 Scripts & Buttons HyperCard 1.2 35.
★Insight Development ... 30 day MBG
6171 MacPrint 1.23 94.
JAM Software
6089 Smart Alarms 3.0 w/Appt. Diary 3.1 63.
6088 Smart Alarms 3.0 *(1-4 users)* 125.
★Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0 34.
2591 The NightWatch 1.03 85.
6134 MacSafe II 107.
★Kiwi Software ... 60 day MBG
6267 KiwiEnvelopes! 3.0 33.
7445 KiwiFinder Extender 1.0 65.
★Loop Software ... 30 day MBG
5442 PictureBook 3.2 39.



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8172 *Mariah 1.0*–The "put everything ... find anything" multimedia organizer! Combine sounds, graphics, text and animation in the same customized catalogue. Search volumes in seconds! 14 image formats supported $94.

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7267 AutoSave II 1.1 28.
7268 POWERicons 1.0 39.
7270 Backmatic 1.1 50.
★MainStay ... 30 day MBG
7722 Marco Polo 1.0.1 152.
★Microcom ... 30 day MBG
4803 Virex 2.8 56.
★Microlytics ... 60 day MBG
2732 GOfer 2.0 45.
★Microseeds Pub. ... 60 day MBG
7068 INITPicker 2.0 35.
Redux 1.62 or Rival 1.1.4 *ea.* 49.
★Microsoft ... 30 day MBG
4471 QuickBasic 1.0 64.
★Millenium Software ... 30 day MBG
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8210 Plottergeist 1.0 199.
★Preferred Publishers ... 30 day MBG
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★Salient Software ... 30 day MBG
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7403 Partner 1.01 56.
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5440 HyperHIT 2.2 special 119.
7450 HyperHIT Relational 269.
★Software Innovations ... 30 day MBG
6647 HandOff II 52.
★Solutions, Inc. ... 60 day MBG
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3449 SuperGlue II 2.01 75.
★Somak Software ... 30 day MBG
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6692 PLUS 2.0 115.
★SuperMac Tech. ... 60 day MBG
3377 DiskFit 2.0 58.
3379 Network DiskFit 1.5 225.
★Symantec ... 30 day MBG
5176 Symantec AntiVirus for Mac *(SAM)* . 67.
5724 Symantec Utilities for Mac *(SUM II)* . 99.
3421 THINK Pascal 3.0 165.
3420 THINK C 4.0 165.
6748 Norton Utilities for the Mac 1.0 84.
★Synex ... 30 day MBG
7147 MacEnvelope 5.0 57.
6666 MacEnvelope Plus 2.0 159.
★Systems Compatibility ... 30 day MBG
7872 Software Bridge 1.0 79.
★Teletypesetting ... 30 day MBG
8058 TScript 92.
★TGS Systems ... 30 day MBG
6667 Prograph 2.0 Compiler Version... 245.
★Williams & Macias ... 30 day MBG
3781 LaserWriter Label Pack *(216)* 18.
6926 myDiskLabeler III 3.0 42.
4976 StickyBusiness 1.3 51.



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8273 Mathematica Enhanced 699.
★Zedcor ... 60 day MBG
3985 ZBasic 5.0 99.

CD-ROM

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8125 Cosmic Osmo *(CD-ROM)* 40.
Broderbund Software
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CD Technology
8057 CD-ROM Porta Drive 649.
★Farallon Computing ... 30 day MBG
6767 MediaTracks Multimedia CD Pack . 319.
★Highlighted Data ... 30 day MBG
7771 Webster's Dictionary *(CD-ROM)* . . 159.
★HyperGlot ... 30 day MBG
7473 Learn to Speak French *(CD-ROM)*. 175.
7829 Learn to Speak Spanish *(CD-ROM)* 175.
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7712 MacroMind CD-ROM 125.



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6744 CDR35 CD-ROM Portable Drive . . 399.
7352 Battery Pack for CDR35 59.
6743 Mac Driver Kit 64.
★Passport Design ... 30 day MBG
8255 Desktop Music Creativity *(CD-ROM)* 189.
★Somak Software ... 30 day MBG
LaserArt CD-ROM Vol. 1 or 2 . . *ea.* 62.
Toshiba
6749 XM 3201 CD-ROM Drive..... 779.
★Wayzata Tech. ... 60 day MBG
8219 CD Funhouse 35.
7966 U.S. Government Seals *(CD-ROM)* . 49.
6576 Vietnam Remembered *(CD-ROM)*. . 69.
6369 The World Factbook 1989 *(CD-ROM)* 69.
7678 USA Factbook *(CD-ROM)* 75.
7679 Disc Tracy Prog. Detective *(CD-ROM)* 75.
7965 Best of MacTutor *(CD-ROM)* 99.
7374 Sport News Baseball Stats *(CD-ROM)* 139.
6370 Quick Art *(CD-ROM)* 175.
7964 N. Amer. Facsimile Book *(CD-ROM)*. 269.

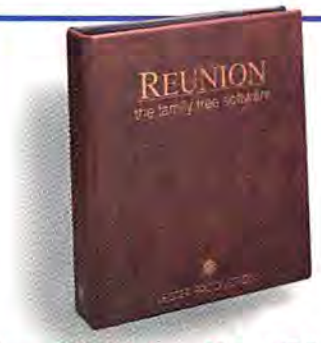


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8217 Ishido: The Way of the Stones 32.
8220 Jack Nicklaus Greatest 18..... 34.
Activision
4486 Manhole 28.
★Aldus/Silicon Beach ... 30 day MBG
Dark Castle or Beyond Dark Castle *ea.* 32.
★Ars Nova ... 30 day MBG
1215 Practica Musica 2.2 69.
★Baseline Publishing ... 30 day MBG
7785 Talking Moose 23.
★Beacon Technology ... 30 day MBG
Gems of The Word 1.0 *(KJ or NI)* *ea.* 25.
HyperBible 2.0 *(KJ or NI)* *ea.* 125.
★Bogas Productions ... 60 day MBG
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Bright Star Technology
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4540 Ancient Art of War at Sea *(CP)* 26.
6516 The Playroom *(CP)* 29.
4229 Carmen Sandiego Series *(CP)* . . . *ea.* 29.
8266 SimEarth 1.0 40.
4966 SimCity 1.2 *(CP)* 29.
5871 SimCity Supreme 1.2C 47.
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Bullseye

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5726 Voyager 1.2 88.

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2268 Crystal Quest 2.2 29.
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7085 *FileGuard Extended 2.5*–Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available $145.

Coda Music Systems

8188 MusicProse 2.0 $299.
5604 Finale 2.5 549.

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1734 Math Blaster! 1.0 *(CP)* 29.
6128 Math Blaster Mystery *(CP)* 29.
8278 Alge-Blaster Plus 35.

Earthquest

8050 Earthquest 48.

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6716 Pipe Dreams 17.
6663 Sands of Fire 32.
6594 Starflight 39.

★First Byte ... 30 day MBG

5294 Puzzle Storybook 1.0 *(ages 3-8)* . . . 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)* 27.

★Great Wave ... 30 day MBG

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2271 ConcertWare+ MIDI 5.1 98.
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Verb Tutor - Intermediate *(Spanish, French, German)* . . . *ea.* 42.
6611 Kanjimaster - Beg. *(Japanese)* 105.
8026 Easy Kana 139.

Individual Software

7425 Training for Microsoft Word 4.0 35.

★Inline Design ... 30 day MBG

5870 Bomber 1.3 *(includes headphones)* 32.
7622 Darwin's Dilemma 32.

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2670 Reader Rabbit 2.2 *(CP) (ages 4-7)* . . 30.
5453 Talking Math Rabbit 1.0 *(ages 4-7)* . 30.

★Leister Productions ... 30 day MBG

7126 Reunion 2.0 89.

★Microsoft ... 30 day MBG

2868 Flight Simulator *(CP)* 32.

Mindscape

4083 Balance of Power 1990 *(CP)* 29.
4596 Deja Vu II *(CP)* 29.

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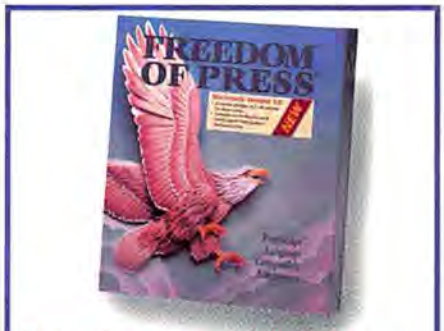
8258 Turbo Math Facts 21.
8256 Hyper Control 31.
8260 Word Quest 31.
8257 PreSchool Pack 36.

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8253 Trax 59.
8254 Desktop Music Creativity 189.
8250 ENCORE 379.
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6466 Citadel 26.

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5773 Strategic Conquest Plus 2.0 34.
5774 NetTrek—The Real Version 2.3 34.

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7689 Leprechaun 29.

Sierra On-Line

3397 Leisure Suit Larry *(CP)* 23.
Manhunter: San Fran. or NY *(CP)* *ea.* 28.

★Softstream Int'l. ... 30 day MBG

4073 Colour Billiards 38.



PowerUp ... 30 day MBG

7698 Fast Forms 2.0 $105.
8028 Address Book+ & Letter Writer+ Bundle . 87.
7694 Address Book Plus 2.0 52.
7697 Letter Writer Plus 52.
7696 Calendar Creator 35.

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4619 Mavis Beacon Typing 1.3 *(CP)* 32.
4588 Life & Death *(CP)* 32.
6111 Cribbage King-Gin King 39.

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Tetris 1.1 or Welltris 1.1 *ea.* 19.
8180 Faces 22.
8181 Vette! 29.
3459 Falcon 2.2 30.

★Spinnaker ... 30 day MBG

2328 Sargon IV *(CP)* 28.

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8098 LSAT Prep for the Mac 35.

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8192 Mum's The Word 81.

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7624 Nemesis Go Master 4.7 41.
7623 Nemesis Go Master Deluxe 4.7 88.

★XOR ... 30 day MBG

6040 MacGolf Classic *(CP)* 52.
8061 MacSki 40.

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6266 InterFax 24/96 Modem 418.

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5173 QuickMail 2.2.3 *(10 user)* 315.

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1673 CompuServe Navigator 3.0 49.
1674 Membership Kit/Navigator Bundle . 69.

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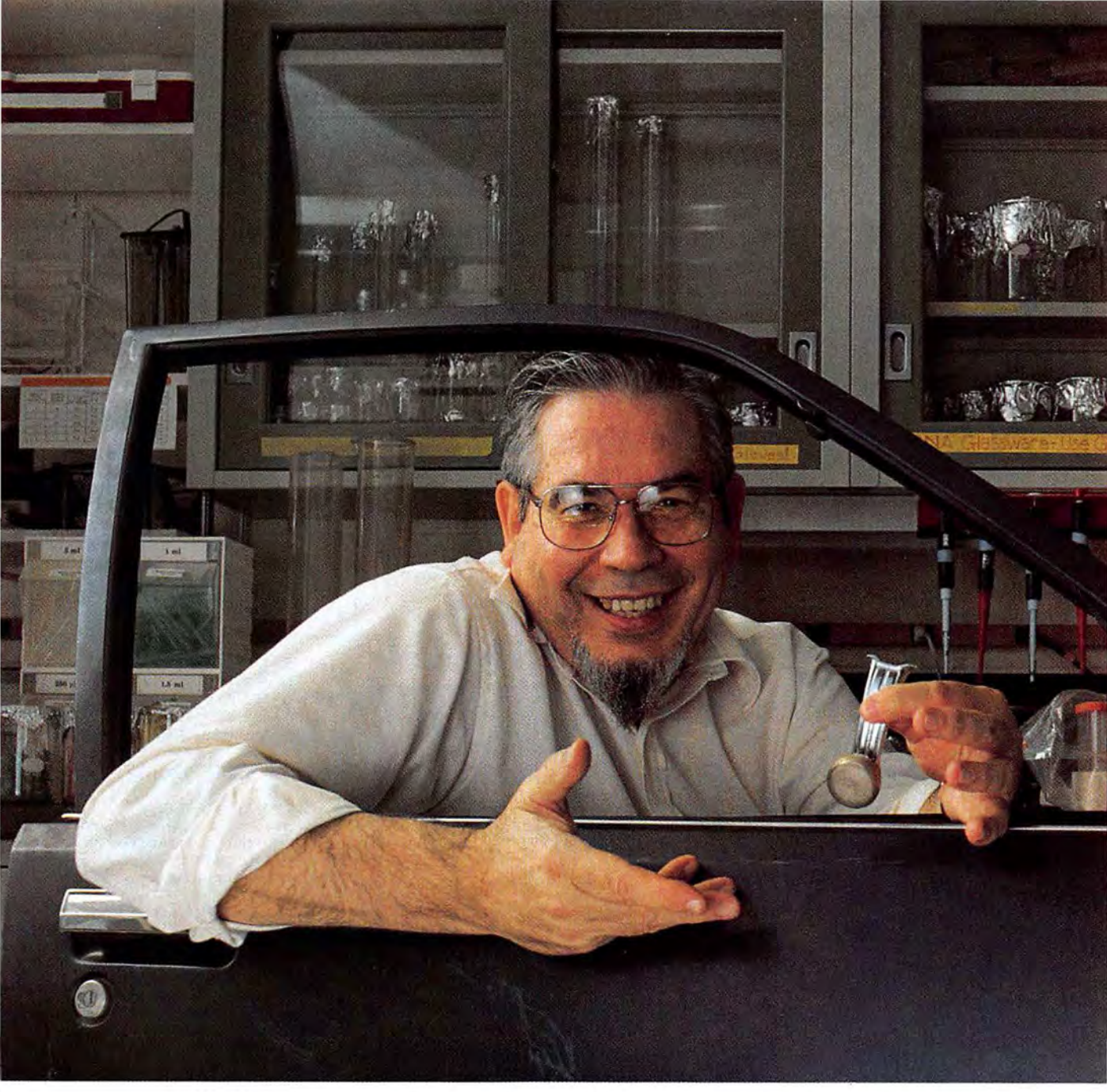
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The Best Little Mac Book



Wuxtry, wuxtry, read all about it: A book that shows you how to use all those little typographic tweaks — such as em and en dashes — that let you spit-polish Mac documents.

Up to now, I haven't reviewed any products, because it takes too much work, but I've finally found a product that was easy and fun to review. Also, the timing for doing a review is good, because this product is an ideal last-minute stocking stuffer for Macintosh owners who have, and think they know, everything. The product is a book called *The Mac Is Not a Typewriter*. I hope I don't antagonize any NRA members, civil libertarians, or Apple honchos by reviewing it; I'm tired of getting hate mail.

The Mac Is Not a Typewriter is a book about how to tweak Mac documents and, according to its jacket, how to "achieve professional-quality type on your Macintosh." Its author is Robin Williams, a teacher, consultant, and desktop publisher in Santa Rosa, California. No, she doesn't make movies about dead poets or selling cars, and she doesn't watch herself in reruns of "Mork and Mindy."

If you think I gush too much about this book, let me tell you in advance that Peachpit Press, the book's publisher, rejected my book, *The Macintosh Way*, so it's not as if I'm doing a favor for a company I like.

Writing Style

It's easy to review her book, because it is short, elegantly laid out, and delightfully unpretentious in tone. You can hear Williams softly and patiently explaining smart quotes and apostrophes, en (–) and em (—) dashes, and special characters. (I wish I could write like she does. She writes like someone playing the violin. I write like someone playing a chain saw.) This is a sample:

The accent marks are a little sneakier than the special characters—easy, but sneaky. If you've ever tried to use the tilde key to type the word piñata with the tilde over the n, you've noticed that it doesn't work—you get pin~ata. That doesn't look very intelligent.

In a mere 70 pages, Williams explains how to make your documents acceptable to Macintosh typography aficionados. Incidentally, these typography aficionados are not nearly as ubiquitous as one might think. (I just learned the word *ubiquitous*, so by golly, I'm going to use it *everywhere*.) Take a look at your manuals and the upgrade announcements from developers, and you'll see what I mean. Most are typographically awful.

If you think you don't need this book, take this test. If you're too lazy to take this test, look at some of your existing documents and see if you violated these rules. (I already know you need it, so here is the book's ISBN number to help you order it: 0-938151-31-2.)

1. How many spaces should go between sentences? (Answer: One.)

2. What's wrong with this sentence? "Apple is going to eat IBM's shorts." (Answer: The quotes and apostrophe are all dumb.)

3. This sentence has three errors. What are they? "The new System shipped -- for what it's worth -- with only 300-400 bugs." (Answer: An em dash {Option Shift -} should replace the --, and the dash between 300 and 400 should be an en dash {Option -}.)

4. True or false: Underlining is a cool way to emphasize words. (Answer: False; use *italics*, **bold**, a larger point size, or a different font.)

Here's a complete list of the book's topics, so you can see what you're missing if you don't buy it: spacing between sentences, quotation marks, apostrophes, dashes, special characters, accent marks, underlining, capitals, kerning, fonts, tabs and indents, widows and orphans, hyphenation and line breaks, leading, justified text, hanging punctuation, and serif and sans serif fonts.

Picky, Picky

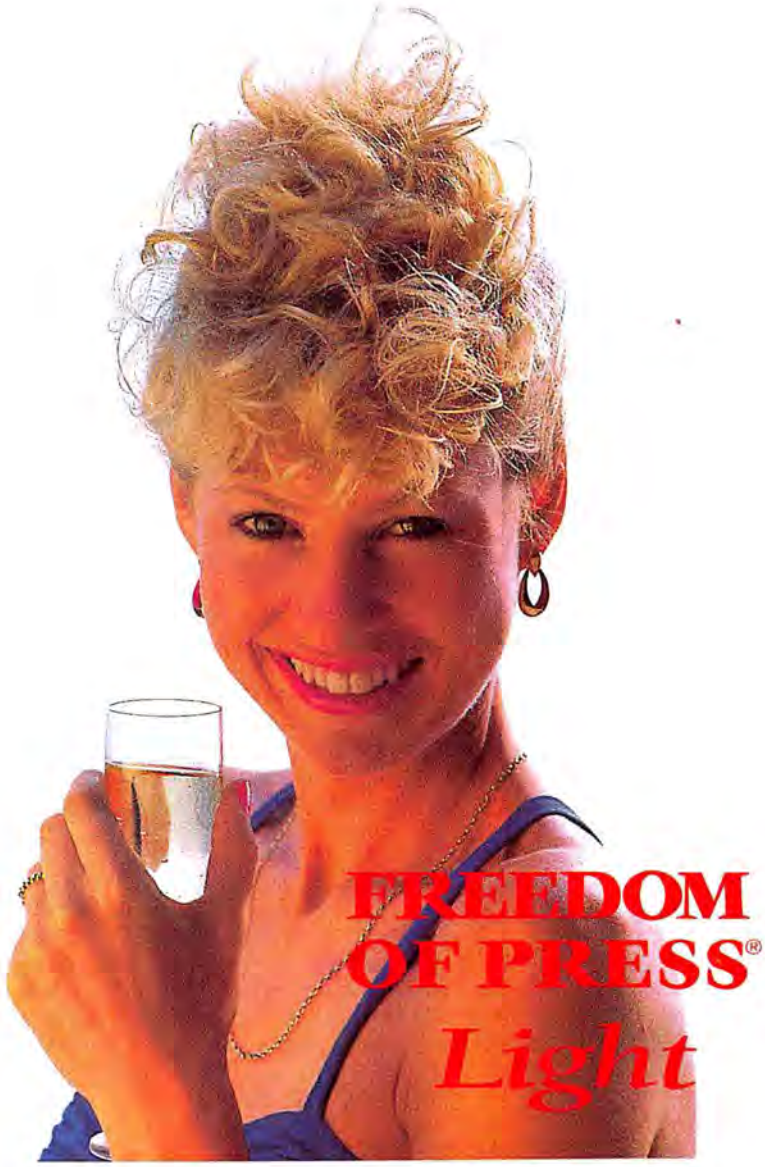
There is one picayune shortcoming in Williams' book. Although it points out the right things to do, it could also provide more information about the right way to fix them. The common scenario I foresee is that people will buy the book and want to immediately "fix" their documents.

For example, Williams could have told readers to use their word processor's Search and Replace feature to automatically search for double spaces and replace them with single spaces. A similar technique is applicable to dumb quotation marks, dumb apostrophes, and em and en dashes.

Maybe she thought these kinds of remedies were so obvious that she didn't have to tell her readers. I don't think they are that obvious. I bet that Williams just never thought of it, and I hope that she'll put this into the next version of her book.

The Dream

OK, I've done the obligatory "point out something negative" part of a review. Now let me explain my dream for a second version of the book. (In a product review, a dream is when a reviewer would have liked to see



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something in the current version but realizes he would be a jerk to ding the product for not having it.) Williams has admirably covered the art of Macintosh typography; now I'd like her to write a book about how the Macintosh can improve one's writing *style*.

Let me explain. Ever since our English classes taught by Miss Burrbottom, we've all heard the rules of good grammar and word usage. However, few of us have the time, energy, or discipline to manually search for mistakes.

Now we have tools that tighten up and correct our writing. Some examples:

1. Trailing prepositions. "Reorganization after reorganization has made Apple a difficult place to work at." Search for all instances of *at., up., with., from., to.*, and so on. Some trailing prepositions may be unavoidable, but at least this method will help you find them so that you can decide.

2. *That* versus *which*. *That* is defining, or restrictive; *which* is nondefining, or nonrestrictive. Wrong: "The computer which is not being used is a PC." Right: "The computer that is not being used is a PC." It's easy to go on a *which* hunt with a word processor's Find feature.

3. Excessive adverbs. Many are unnecessary. "He angrily trashed Windows." It's difficult to see how anyone could trash Windows and not be angry. Search for *?ly* (*?* is the wildcard character) in your word processor.

4. More excess verbiage. The ubiquitous word *very* usually doesn't add (very) much to your writing. Cut it out and see if your sentence isn't as strong — perhaps stronger. Try this with *kind of* and *sort of* too. In fact, *kind of* should not be used to mean *somewhat*. The correct usage is "Macintosh is a kind of computer," not "An IBM PC is kind of hard to use."

You get the idea. Williams is the perfect person to explain these rules and how we can use a Mac to improve our grammar and style. I think it's her moral duty.

The bottom line: Buy this book. Buy two so you can keep one when you give the other as that last-second Christmas gift. (It's only $9.95.) Then write Williams and ask her to do the style and grammar book. (If you do, be sure you observe all her rules.) One more thing: If you see me breaking any of Williams' rules, don't point it out to me.

[*Fortunately for Guy, the* MacUser *copy desk is able to correct the ubiquitous occurrences of grammatical and stylistic infractions. — Ed.*]



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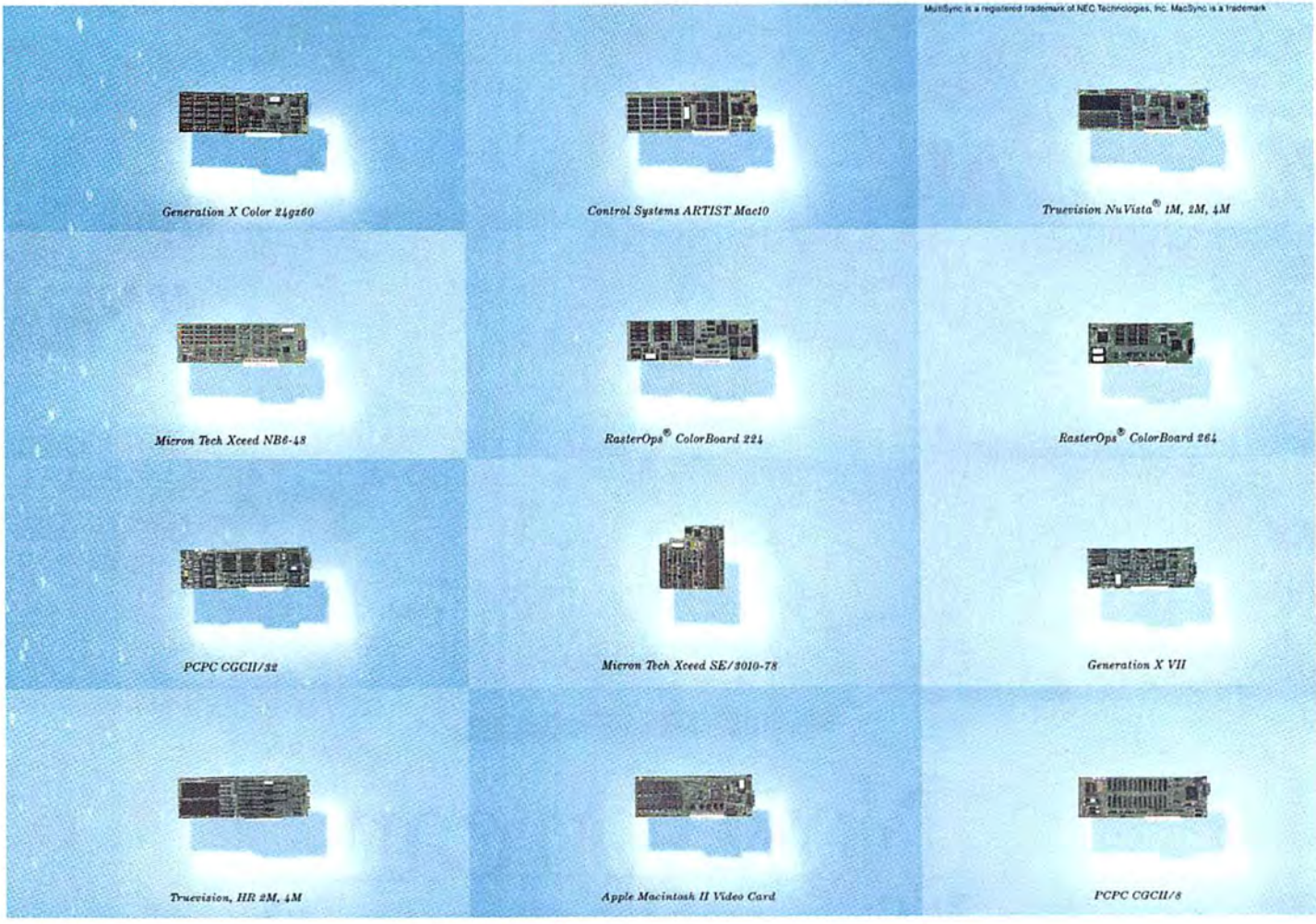
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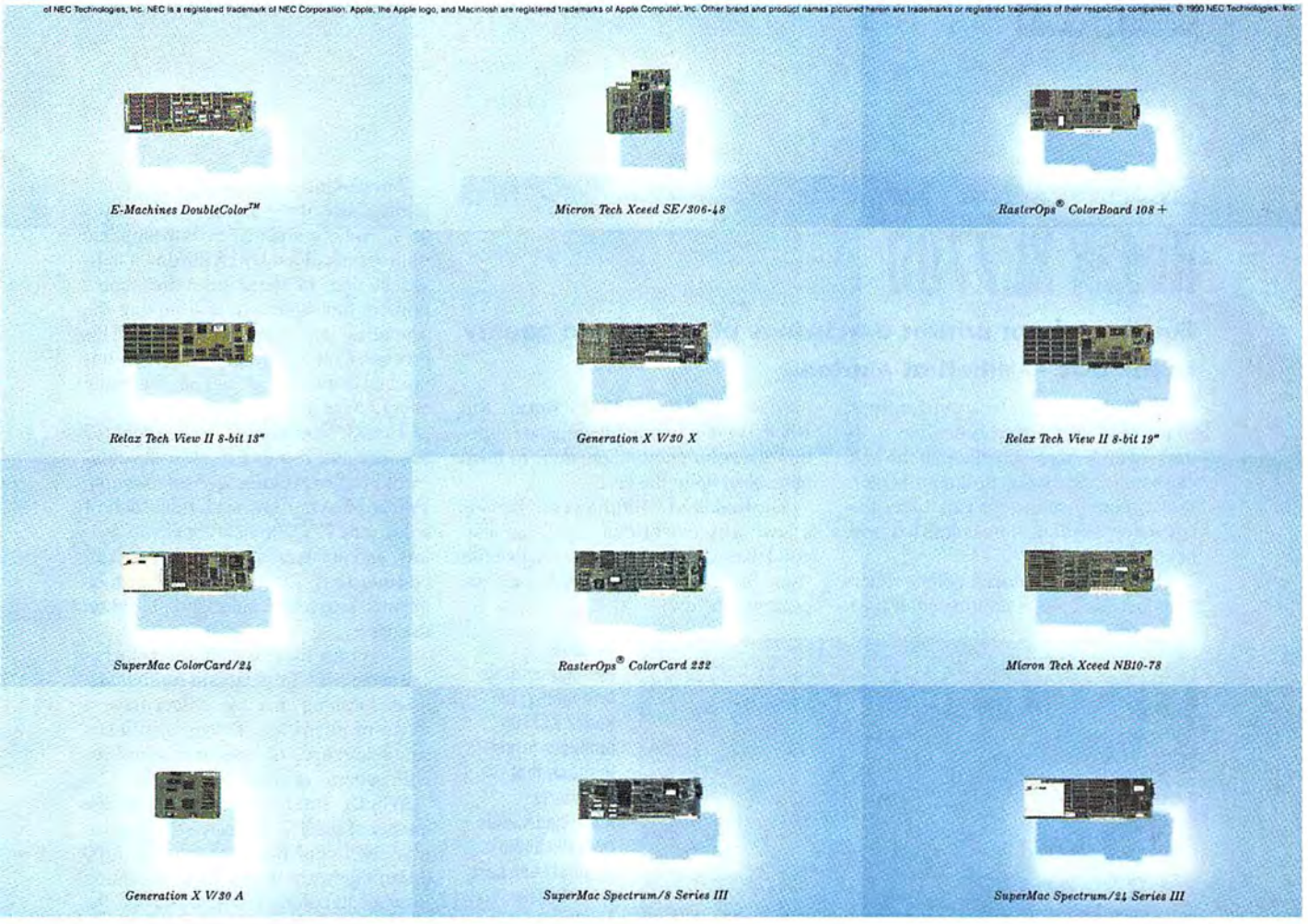


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PRINTERS

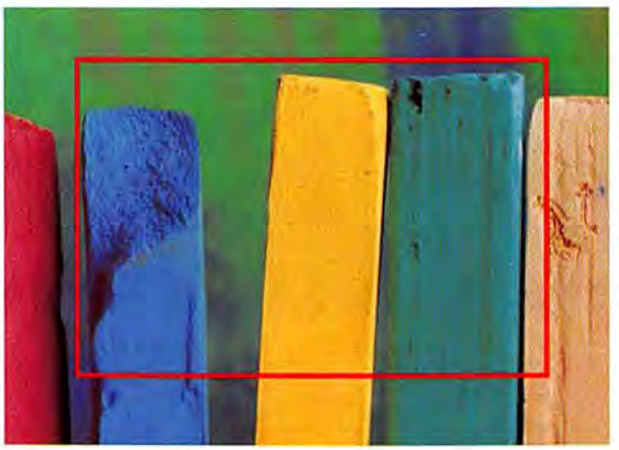
Kodak XL7700

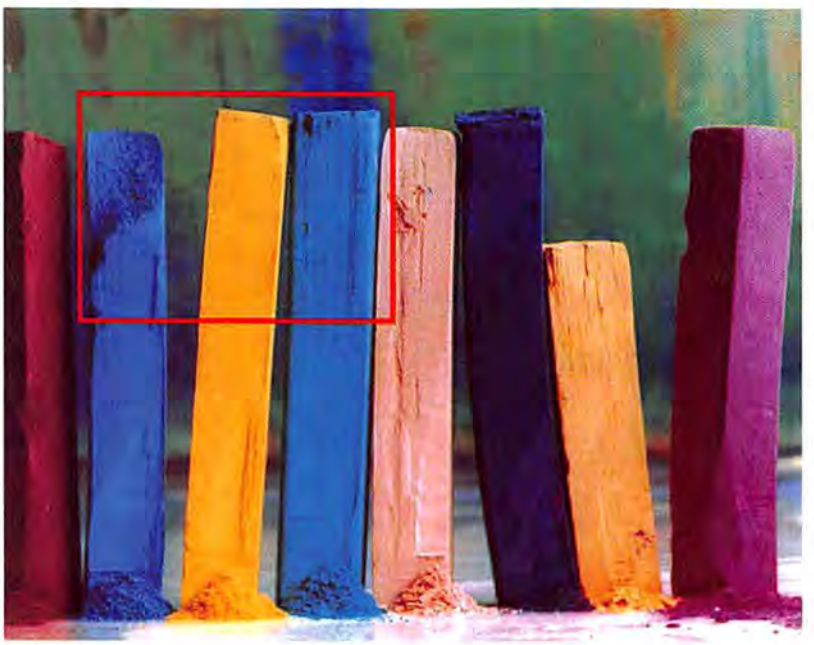
Finally, a color printer that brings photographic quality to the Mac — albeit at a price.

When it comes to color output, Macintosh users have been like a fly trapped under a glass. Although the Mac can handle and display millions of colors — far more than the eye can discern — accurately printing those colors has been nearly impossible.

There are a few dozen color printers that do a good job of printing color type, bar charts, and simple PostScript art. But when it comes to reproducing the subtleties of a color photograph, none of them have been up to the task.

The Kodak XL7700, however, heralds a new era in color printing, with output so good that you'd be hard-pressed to tell it from the original photograph (see the examples below).





By using dye-sublimation technology, the Kodak XL7700 produces prints (bottom) that are nearly indistinguishable from the photo original seen here (at left). The highlighted areas are shown for comparison.

Three-Color Printing. All color printers use three primary-color dyes (cyan, yellow, and magenta) to simulate millions of colors. By laying down individual dots of these primaries, most printers fool your eye into mixing the primaries into the desired hues. This process, called *dithering*, is how all traditional printing is achieved, including every image in this magazine.

The XL7700 doesn't have to fool the eye, because it uses the latest development in color printing: *dye sublimation*. Instead of laying down individual dots of colors, the XL7700 heats the cyan, yellow, and magenta dye layers on its ribbon into a gas. The gaseous dyes are then blended into a true color and placed on the paper.

The prints look like photographs because the XL7700 prints are *continuous-tone*, meaning that the colors have a range of intensities. Dithering printers simulate ranges of hues and intensities with patterns of color dots.

What's amazing about the image quality of an XL7700 print is the fact that it's only 200 dpi. But because the XL7700 doesn't dither, it doesn't lose resolution to create its colors. To the naked eye, the XL7700's prints look better than any image in this magazine.

Printing Process. I used an Adobe Photoshop plug-in driver for the XL7700. During testing, the Photoshop driver was the only software available for the XL7700, so I could print only images that opened with Photoshop. Fortunately, Photoshop can open virtually every file format, but a PostScript solution is lacking. The XL7700 is primarily for printing continuous-tone photos and images, but Kodak must address PostScript as well.

At press time, two third-party drivers had been released and a few more were waiting in the wings. CAI now offers a driver for the XL7700 in Freedom of Press Professional, which lists for $1,295. Media Publishing Group offers a Mac-based software RIP, written by Knowledge Software, called Magic Rip, which prints directly from several of the top graphics applications, including QuarkXPress 3.0, Adobe Illustrator, and Aldus FreeHand. Kodak also announced plans to develop its own hardware PostScript RIP, complete with an Ethernet connection.

Because the XL7700 doesn't dither, you are able to use the full resolution of



Kodak's XL7700 is a rugged piece of rack-mountable equipment that produces the best color prints you've ever seen. Even though its actual resolution is 200 dpi, the Kodak XL7700's prints look much sharper, thanks to continuous-tone technology.

a 200-dpi image when printing to the XL7700. But because a full 11-x-11-inch image at 200 dpi is a whopping 12 megabytes, I struggled to manipulate my images, even with a Mac IIci and a cache card. Once an image is ready to print, however, there's little waiting. Because the XL7700 doesn't need to process the image, it's a simple matter of sending down the bits of data. The interface is through a GPIB (general-purpose interface bus) NuBus card, connected to the parallel port on the printer. A full 11-x-11-inch image downloaded in about 3 minutes. An image of the same size on a PostScript color printer would easily have taken more than 30 minutes.

The Bottom Line. The Kodak XL7700 is a solid piece of functional elegance. It's even rack-mountable. The paucity of bundled software solutions can be circumvented by using third-party drivers, and more PostScript solutions are on the way. The only remaining drawbacks are the XL7700's high cost and the high media cost: 8.5-x-11-inch color prints cost $3.85 each, and 11-x-11-inch prints cost $4.35 each. The paper, which comes in boxes of 200 sheets, costs $200 and $300 for the two sizes, respectively. Color ribbons that are capable of printing 100 sheets are packed in boxes of two and cost $570.

Media costs, however, will drop as sublimal-dye printers become more popular. Even with its high media price, the Kodak XL7700 pushes color printing to its logical conclusion, providing images that look as good as the original.

At a starting price of about $25,000, and with the high media costs noted earlier, the XL7700 is clearly not going to be your everyday printer of choice. In fact, the XL7700 is best used in conjunction with a more conventional, thermal color printer. The thermal printer has the advantage of being less expensive to purchase and operate, so you can use it for making quick color checks and reserve the Kodak unit for final color proofs. Considering how much conventional color proofing can cost, the XL7700's initially high price tag may prove economical in the long run — especially for companies that do a lot of color work. The Kodak XL7700 signals a new standard for color printing and ushers Macintosh users into the world of true color.

— Paul Yi

Get Info

Kodak XL7700

★★★★½

Manufactured by: Eastman Kodak, 343 State Street, Rochester, NY 14650; (800) 445-6325.

List Price: $24,895.

NewsLine

Reports and Analysis

Apple Seeking Japanese Partners?

TOKYO, JAPAN — Responding to the increasing importance of global markets, Apple Computer executives broadly hinted that Apple may soon form a formal relationship with Sony. At the first Apple board of directors' meeting held in Japan, Apple CEO John Sculley stressed the importance of international markets and hinted that Apple may look favorably on a Japanese business partner. Reports coming out of the meeting strongly suggested that one of the first results of an Apple/Sony teaming would be that Sony would manufacture an inexpensive "notebook" Mac that Apple would design and sell. Although no formal announcement was made, both Sculley and COO Mike Spindler acknowledged that there are no more "sacred cows" at Apple, which suggests that Apple may license its Macintosh technology to Sony as part of the new portable deal. Shortly after news of the Sony negotiations circulated, a similar story involving Toshiba surfaced. Apple has never used an outside manufacturer for its computers.

Gassée to Be

SAN MATEO, CA — Less than a week after his formal departure from Apple Computer, Jean-Louis Gassée, the flamboyant former president of Apple Products, has resurfaced with a new company, Be Labs, Inc. Gassée is the sole financier of Be Labs and has issued no statements about what the company plans to manufacture or when its products will come to market.

LaserJet Warning

PALO ALTO, CA — Users of the Hewlett-Packard LaserJet IIP should be aware of a U.S.-only toll-free number, (800) 233-5153, for advice on faulty power supplies. Approximately 70,000 of the first IIPs manufactured may have power supplies that need repair, and the company is urging its customers to call and find out if they have a bad machine. HP says that the power supplies pose no safety hazard but that the control panel will flash the message "50 Needs Service," which prevents the printer from operating. Users with bad power supplies can either have the printer repaired free or can return the unit to HP for a remanufactured replacement.

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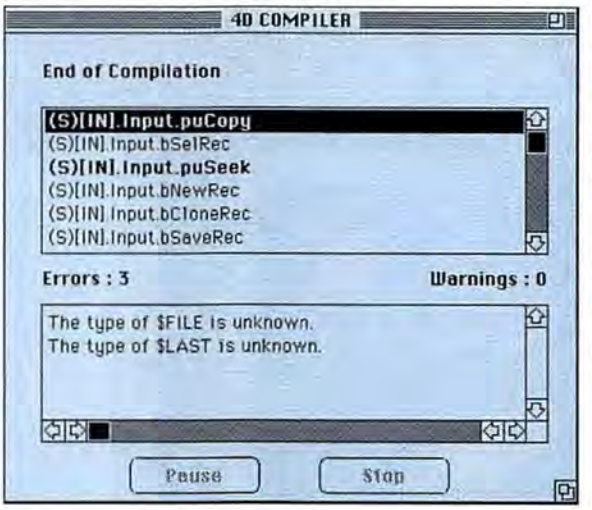
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DATABASES

4D Compiler

ACIUS' compiler is the speed fix 4th Dimension has been waiting for.



The 4D Compiler may be the answer for 4D developers who've agonized over 4D's pokiness in the past. In the compiler's main window, scripts and procedures with errors are shown in bold. Clicking on an item shows the errors associated with it.

Lack of speed has been the bane of 4th Dimension's existence ever since its initial release. Version 2.0's speed improvements took the program from the pedestrian to the airborne, however, and the new 4D Compiler takes the package into hyperspace.

Compiled, Not Interpreted. With an uncompiled 4D application, the Mac actually spends more time converting your code into machine language than it does performing tasks. Languages that perform this stepwise conversion are called interpreted. The 4D Compiler preorganizes your application into machine language, bypassing the interpreter and thus speeding up the application.

The 4D Compiler strips out everything you can read from your application, including the design environment. It creates and works on a copy of your database; your original source file is left intact. Whenever you make changes to the source file, you can recompile as needed. The compiler doesn't touch your data, and you can use the same data file simultaneously with a compiled and an uncompiled structure.

Compiling does not speed up disk- or network-access operations, only user-defined procedures. A routine that loops through an array and changes the values of variables shows a dramatic performance improvement, but a routine that loops through and updates records in the current selection is not significantly faster. You can probably see some improvement in the redraw times for output layouts that contain a layout procedure.

Using the compiler to develop a database requires more consistency than developing for the interpreter. For example, the interpreter lets you assign *0* to a variable called vTemp in one place and *A* to vTemp in a different place, but the compiler doesn't. The compiler will complain if you try to redefine variables. Generally, you won't produce a compiled application on your first try, but the 4D Compiler provides a wealth of information as it attempts to convert your application. To help trace your mistakes, the 4D Compiler can optionally generate a symbol table and an error file. These two diagnostic tools greatly simplify the process of making an application compiler-ready.

The symbol table tells you where the compiler first defined every global variable in your application and gives you the variables' data types. It also describes all the local variables and parameters associated with procedures and functions. The symbol table can tell you a lot about how tidily you use variables and more.

You can open and print the error file with a word processor, or you can use it in conjunction with 4D's design environment. When 4D sees an error file in the same folder with your structure file, it opens the error file and installs new menu items on the Use menu. The Next Compiler Error command opens each offending procedure and script and highlights the troublesome line.

The Range Checking option handles mistakes such as indirect reference to the 100th element of an array that has only 25 elements. Without range checking, your compiled application would simply crash rather than putting up a courteous error message. Range checking slows your compiled application, so you should add your own range-checking statements with an eye toward turning off Range Checking at some point.

You can set the compiler for script-manager compatibility to support writing forms such as Kanji. The Processor Type choice can further optimize certain routines by tailoring them for specific 68000-family processors.

You can now blend 4D Runtime into your compiled application, creating a double-clickable application, with your own icons. This feature should make "4th party" developers salivate. A new 4D 2.1 command, Set About, lets you specify the text for the About menu item on the Apple menu and the routine that runs when that item is chosen. A 50-pixel region at the top of your About box tells

4th Dimension 2.1

Several new features in 4th Dimension 2.1 are not related to the compiler. One useful new feature is the Open Data File command, which lets you support multiple files in the Single User mode. The Automatic Relations command lets you temporarily treat all "manual" relations as automatic ones, which is particularly useful with the Search Editor and the Label Editor.

4D 2.1 features Multi-Transactions that are slightly slower than the original transactions, but all users on a network can now have a transaction going at the same time.

If you use pointers, you're likely to enjoy the Self and Nil functions. Self returns a pointer to the object it was used in, making code even more portable than before. Nil is a function that checks a pointer to see whether it points at nothing (»[]).

Although it's preferable to have more memory (I recommend 1,500K), 4D 2.1 can now run in as little as 500K. In tight memory situations, 4D swaps code from disk more often, which makes it slower, but at least it runs. With this latest version, ACIUS keeps 4D at the top of the Mac-database heap.

the user that the application was created with 4D: Everything else about your application is your own.

The 4D Compiler lets you create a project file that remembers your compiler setup options and your source file. You can double-click on the project file and get right to compiling.

The compiler and 4D both make good use of the Mac RAM cache, and they work very well under MultiFinder. Compile times can be dramatically reduced with the RAM cache turned on. You can also get work done in another application while the 4D Compiler chugs along on your 4D project.

I often run 4D 2.1, the 4D Compiler, and Word simultaneously. That way, I can step between errors, recompile at will, and review the symbol table as needed. Word's Open Read Only option is handy—you don't have to worry about the compiler finding the symbol table busy!

The compiler has a couple of quirks I would like to see changed. The Next Compiler Error command does not handle general errors. You'll want to keep the compiler open or print the error file to locate and fix those errors. Also, Next Compiler Error doesn't skip warnings. Although errors prevent the compiler from creating a compiled structure file, warnings are not necessarily a problem.

General errors can prevent the 4D Compiler from compiling your project, so you're likely to be confounded when the error count increases after you've fixed the general errors. Sometimes, the compiler error message simply reads "Syntax Error" — not a particularly enlightening message. If an error occurs that's caused when a parameter of the wrong type is passed to a procedure or function, the compiler doesn't tell you which is the offending parameter.

It's a good strategy to recompile fairly frequently. This provides the ego feedback of seeing the error count drop and keeps the error information current. If you've got 200 errors, don't slog through them all at once. Changing one line of code can sometimes wipe out five errors. As you fix problems, the Next Compiler Error command continues to take you to related errors that have been fixed.

Unfortunately, the 4D Compiler is copy-protected. It asks for the key disk on the first launch after any install and asks for the disk again randomly (roughly once every 40 launches). If you're using



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To help you save time, the 4D Compiler lets you set several options each time you open a compiler project. These options can be saved in a file and reused in other projects.



Choosing the compiler's Next Compiler Error command from the Use menu brings up the offending procedure or script and states the problem at the top of the window. If a line number is associated with the error, the line is highlighted.

the 4D Compiler at home and at work, the only safe method of operation is to carry the key disk with you, which means a higher probability of corruption. With key-disk protection, there really isn't much you can do to protect yourself from being accidentally locked out at a crucial moment.

The Bottom Line. At a list price of $1,000, the 4D Compiler isn't a product that most users are going to rush out and buy — much less use. This is a serious developer's tool. But it would be wrong to assume that the 4D Compiler will have no impact on average users. With the spate of new 4D-based applications that are sure to emerge as a result of the compiler's release, users who otherwise might never even consider looking at 4th Dimension may find themselves becoming productive using a 4D application. Who knows — the 4D Compiler may finally help give the Mac the one thing it has always lacked: a de facto relational-database standard. It's interesting to watch 4D evolve, incorporating what is clearly user-inspired features. The 4D Compiler and 4D 2.1 provide a sophisticated development environment that begins to rival language tools but doesn't require the skills of a MacApp developer to master. In a way, the compiler has completely stolen the show from 4D. This package is more important than just about any other 4D-related tool I've seen so far. If you're serious about 4th Dimension development, you can't afford to miss it.

— Louis E. Benjamin, Jr.

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4D Compiler

★★★★½

Published by: ACIUS, 10351 Bubb Road, Cupertino, CA 95014; (408) 252-4444.

Version: 1.0.

List Price: $1,000; registered-developer price, $700.

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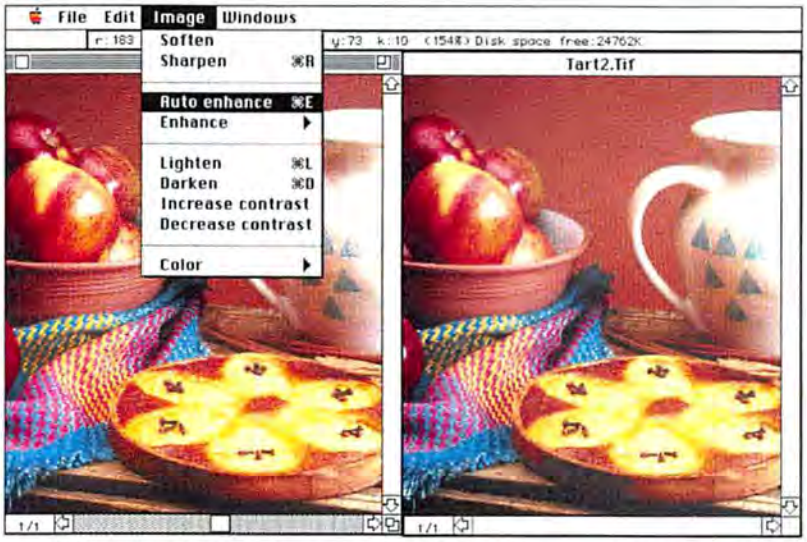
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DESKTOP PUBLISHING

Aldus PrePrint

Aldus' separation utility has its flaws, but it's the best tool for creating PageMaker separations.



Aldus PrePrint is the best color-separation utility for PageMaker, even though it still has a few bugs. To help create optimal separations, PrePrint includes some image-control functionality. You can see the impact of the Auto Enhance function in a before (left) and after (right) view.

When DTP output meant only laser-printed quality, PageMaker alone was enough. But now that the DTP envelope has been pushed all the way to full-color prepress, Aldus has released Aldus PrePrint, a utility that has only one purpose: to produce color separations.

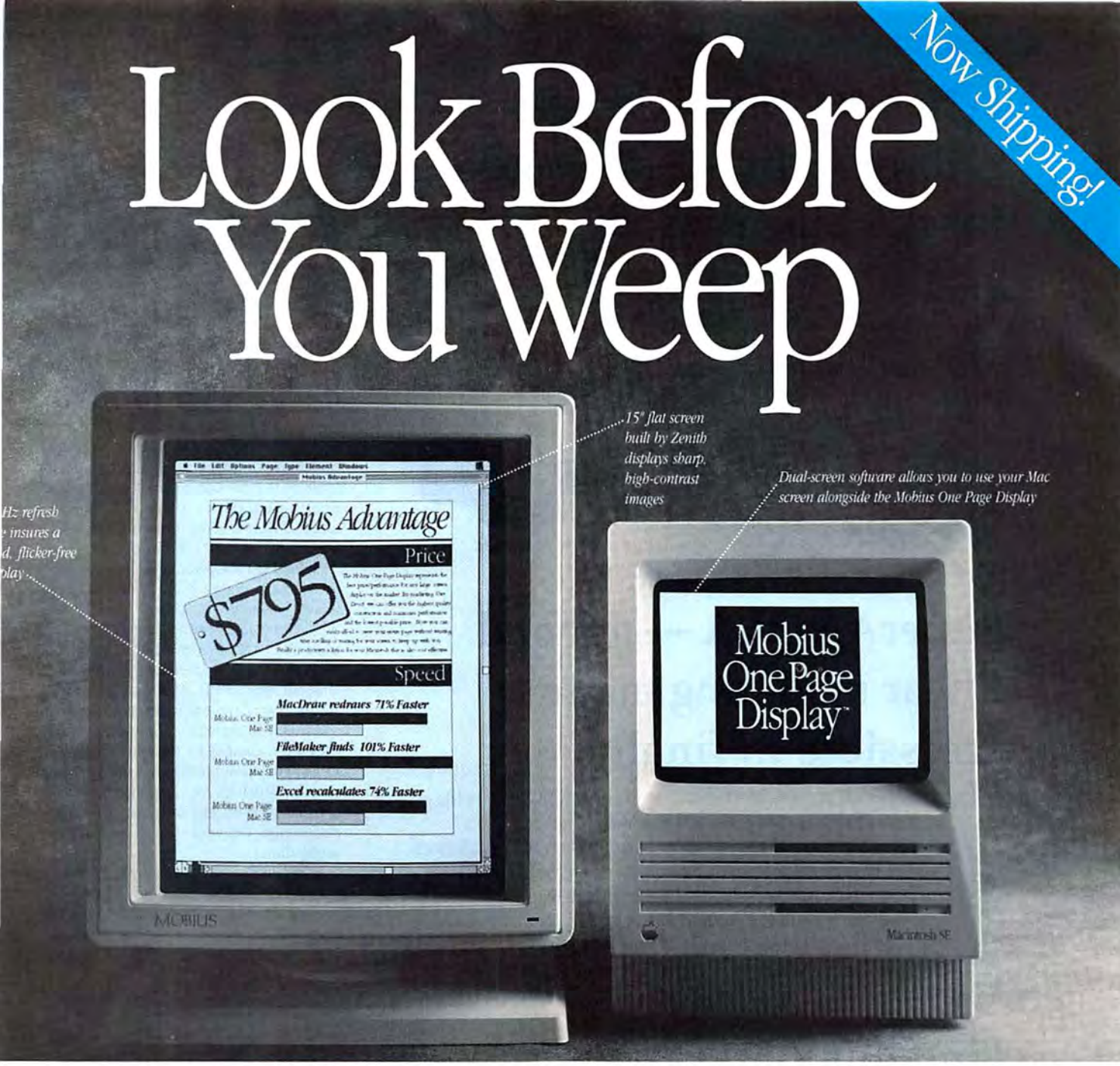
Printing and PrePrint. Because PageMaker Color Extension and PageMaker 4.0 are as yet the only applications that support PrePrint's full functionality, I'll include them in this discussion of PrePrint. When you use PrePrint, the first step is to create a PostScript file with OPI (Aldus' Open Prepress Interface) comments that conform to Adobe color-separation conventions. When you're ready to separate, use the Print dialog box to select the printer your separations are to be printed to. Choose the Print PostScript to Disk option, with the For Separations radio button selected. PageMaker then creates an OPI file with the .SEP extension.

PrePrint's primary window feels strange. When you first open a separated file, PrePrint finds the linked TIFF and MacPaint files, opens the images, and displays the primary window. This small window displays the names and locations of the different images in your document. You can select the images individually and mask those that need to be separated conventionally, but recreating a display from a PostScript file requires Adobe's Display PostScript, which Apple doesn't license. Images do display, fortunately, and you can add minor enhancements to them, but PrePrint is no Photoshop.

Better Pictures. PrePrint's image enhancement is basic but adequate for a color-separation program. A printed color image is essentially a combination of four superimposed halftones. Images can be divided into three assemblages: darker tones are grouped as shadows, lighter tones are highlights, and the tones in the middle are called midtones. PrePrint lets you achieve various effects by manipulating shadows, highlights, or midtones. It also provides some global image controls. You can soften or sharpen an image

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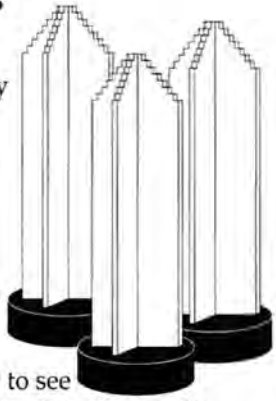
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and change the saturation and lightness.

Another noteworthy feature is PrePrint's ability to adjust contrast by globally changing the difference between light and dark pixels. Auto-balance is useful for images that have an overall cast, but it can be disastrous to images that have no neutral areas.

From PrePrint to Print. The Print dialog box is the heart of PrePrint; it has two related printing dialog boxes — Print Options and Press Controls.

The Print dialog box gives you the option of printing an image as color/gray scale or as monochromatic. You can also print separations or a composite of the image. Printing separations is the default for color TIFF and OPI files.

Selecting the Options button takes you to the next dialog box, Print Options, which is where you choose the printer type. Choosing a printer also selects the right PPD (PostScript-Printer Description) and PDX (Printer-Description Extension) files. PPD files, published by Adobe, carry the optimal screen angles and frequencies that reduce moirés. PDX files were created by Aldus to improve PPDs. They provide information, such as specific densities for screen tints, that is not provided by PPDs. It can make the difference between good and so-so separations.

Once you've selected an ink, PrePrint gets the optimized screen angle and frequency information from the PPD file to display in the Angle and Ruling boxes. If you are adventurous, you can change these to your liking.

PrePrint also lets you print your image as either a negative or a positive, with the emulsion up or down. Every printing house has a preference, so a phone call beforehand can save you time and money.

Selecting the Printer Marks option prints crop marks, registration marks, the filename, the ink name, the page number, and the date. If an image is too big to fit on your page, PrePrint rotates the separations 90 degrees. If your final output device is not available, you can use the Print to Disk option. PrePrint then creates an ASCII file with images represented in binary code (you can output a hexadecimal representation if you hold the Shift key down when issuing the Print command).

The Press button takes you to the Press Controls dialog box, where you select the optimal configuration for the paper stock you want to use for final printing.

PrePrint Problems. PrePrint does justice to TIFF and true EPS files, but results with PICT, PICT2, and nonconforming EPS files are unpredictable. Aldus recommends that those files be converted to EPS or TIFF before you import them into PageMaker.

Another problem is that PrePrint prints all its color separations one after another, so all the magenta separations are output together, all the cyans, and so on. This may cause registration problems. A workaround is to print only one page at a time. Aldus and at least one third-party vendor are working to fix this problem. PrePrint represents black with the three process colors, which increases the chance for moirés.

Division of labor between PostScript service bureaus and desktop publishers is still being worked out, so whether PrePrint is right for you will depend on your relationship with your service bureau. Service bureaus that are primarily output centers don't like the extra work involved in creating PageMaker color separations. Customers who work with these service bureaus are better off creating their own PostScript files. This way the service bureau has only to open the PostScript files in PrePrint and output them. Service bureaus that provide a range of prepress services have imagesetters as just a small part of their overall services. These bureaus are only too happy to take your PageMaker pages, create PostScript files, and output them through PrePrint. Professional publishers are generally better off with bureaus of this kind.

The Bottom Line. Overall, PrePrint is an excellent production tool for color separations. My favorite separation program for PageMaker used to be Adobe Separator. No longer, though, because PrePrint gives consistently better separations for PageMaker documents than any other program does.

— Jim Quraishi

Get Info

Aldus PrePrint

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Published by: Aldus, 411 First Avenue S., Seattle, WA 98104; (800) 638-5078 or (206) 628-2320.
Version: 1.0.
List Price: $495.

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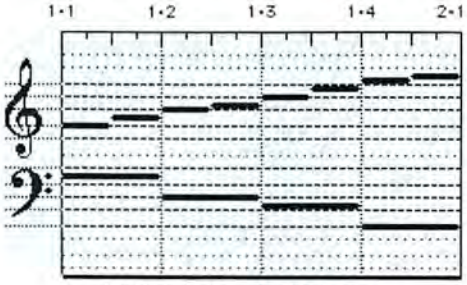
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INTEGRATED SOFTWARE

Desk

Zedcor's septet of applications takes aim at Microsoft Works.

Desk is a group of seven DAs intended to provide an alternative to Microsoft Works' long monopoly on integrated software. Desk's component DAs are the previously released DeskPaint/DeskDraw twins; DeskWrite, a word processor; DeskSecretary, an alarm and reminder program; DeskCom, a basic communications program; DeskCalc, a spreadsheet program; and DeskFile, a flat-file database manager.

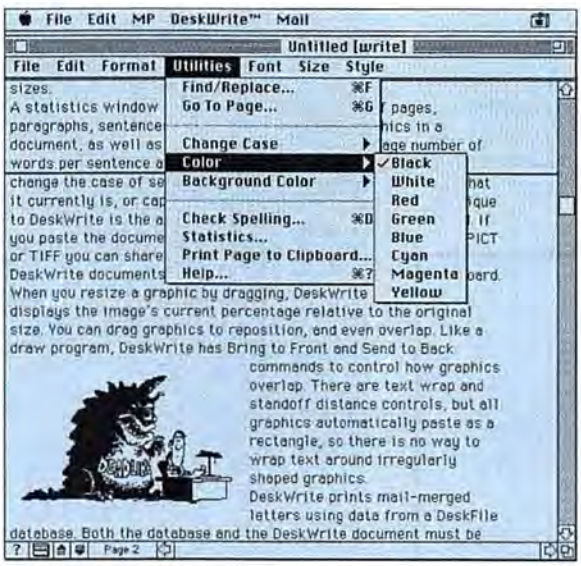
Zedcor has a history of providing DAs with the capabilities of full-blown applications. DeskPaint, DeskDraw, and DeskWrite are examples of well-conceived and -executed programming. DeskSecretary and DeskCom are competent copycats of existing software, whereas DeskCalc is a full-featured spreadsheet program that's slower than its equivalent in Works and DeskFile lacks fundamental features that would make it useful.

Old Masters. DeskPaint (see review, November '90, page 76) and DeskDraw 3.0 are the the same excellent programs that Zedcor sells separately.

Zedcor's experience in developing DeskPaint and DeskDraw has given birth to a window style used throughout Desk's DAs. The Mac's operating system normally limits DAs to a single menu in the main menu bar. To make these DAs feel like applications, Zedcor places full menu bars beneath the title bar of each window. In addition, buttons on the left side of the horizontal scroll bar give one-click access to popular menu items such as Help and Page Up and Page Down.

Words. DeskWrite saves and opens documents in three file formats: its own, MacWrite 5.0, and text. Ruler and key commands closely parallel Microsoft Word's, so users of the many applications that have adopted Word's peculiar command set will feel at home. All the features of a good basic word processor are here, including Find and Replace commands and a 100,000-word spelling checker. In addition to left, right, center, and decimal tabs, DeskWrite supports tab leaders. You can place vertical rules between columns of tabular data and put borders or boxes around paragraphs. It's easy to change the color of selected text, box or border lines, or the background color to any of the eight standard QuickDraw colors. DeskWrite doesn't support style sheets, multicolumn layouts, or specifying leading separately from font sizes, however.

A statistics window displays the current number of pages, paragraphs, sentences, words, characters, and graphics in a document, as well as the memory used and the average number of words per sentence and characters per word.



DeskWrite is a reasonably complete word processor in a DA. To give Desk's DAs the feel of applications, Zedcor includes a full menu bar within each window below the title bar. The buttons at the left side of the horizontal scroll bar let you summon the help screen, call up the ruler, and page up or down.

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But there's more you can do. (The feature is called XTND.) You can import graphics, not only from Macs, but many computers, guaranteed. And you can scale and crop them, one and all, in your MacWrite II document. In short, MacWrite II with XTND is a powerful word processor that lets you freely exchange text and graphics. You'll find also that your MacWrite II lets you change fonts, styles, sizes and colors, as well as text with its find/change feature. And you can create custom styles and save them as stationery — with all formats preset. You'll share your reports and letters quickly.

But what good is freedom of expression if you find your editing to be a hassle? That's why the page layout and editing is fully WYSIWYG: the thoughts you see are the thoughts you get. This WYSIWYG feature, by the way, is found only with MacWriteII. It's another way Claris simplifies word processing for you, whether you're 52, 22, or 72.

Called upon daily MacWrite II smooths your writing assignments and other chores. There's MacWrite II spell checking, for example, and foreign dictionary programs that are optional, and a host of other features that come standard. (Like a thesaurus, and a mail merge feature you'll discover saves lots of time.)

What it adds up to, you'll find, is a simple and powerful tool designed for people. All the people. It is for writers, and it is for business people. And it is for those of us in between. The freedom to write is liberating. Now technology is, too.

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Some XTND translators are optional. They are supported within MacWrite II 1.1 when you buy and install MacLinkPlus from Data Viz, Inc.





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Up to Date

Changes New and Noted

M.Y.O.B., Teleware's all-in-one small-business accounting package, has grown to version 2.0. The latest version boasts 26 new features such as a built-in color draw environment for creating custom checks and forms, the ability to change and auto-reverse an invoice or purchase order, an expanded to-do list that shows all receivables or payables, an expanded collection of reports, and a personal-information manager that includes a Rolodex and contact log. Although M.Y.O.B. still uses a double-entry accounting model, it's designed primarily for businesspeople who aren't trained accountants. Teleware, 22 Hill Road, Parsippany, NJ 07054; (800) 322-6962 or (201) 334-1154. Version 2.0. $249; upgrades, free to members of Teleware's extended support program; $10 if the previous version was purchased after August 1, 1990; $59, if purchased before August 1, 1990.

Interactive Physics, a physics lab on a disk, has been upgraded to version 1.2. The major improvements are up to 8-bit color; direct printing of individual animation frames, sequences, and graphs; the ability to export data as a text file; and user control over the number formats. The new version comes with a 350-page textbook, *Physics Interactions,* that details how to set up experiments in the program. The textbook has an instructor's guide that answers questions and a student worksheet for each experiment. Knowledge Revolution, 497 Vermont Street, San Francisco, CA 94107; (800) 766-6615. Version 1.2. $249; upgrades, free to registered owners if the previous version was purchased after August 1, 1990; $29.95 if purchased before August 1, 1990.

Shortcut 1.5 is the latest edition of Ray Lau's navigation utility. It lets you view and work with StuffIt archives as you would with normal folders, providing automatic unstuffing when you open a compressed file. Like StuffIt Deluxe, Shortcut 1.5 includes a text and PICT viewer. Shortcut can search files — even files contained in StuffIt archives — and includes a Secure Erase command that permanently erases data, making it impossible for even data-recovery programs to retrieve the information. Version 1.5. Aladdin Systems, Deer Park Center, Suite 23A-171, Aptos, CA 95003; (408) 685-9175. $79.95; upgrades free to registered owners.

Menu commands specify the case of selected text: lowercase, uppercase, the opposite of what it is currently specified, and word or sentence capitalization. A feature unique to DeskWrite is its ability to print a document to the Clipboard. If you paste the document into a graphics program and save it as a PICT or TIFF file, you can share it with others who don't have DeskWrite.

DeskWrite documents accept any graphic pasted from the Clipboard. When you resize a graphic by dragging, DeskWrite interactively displays the image's current percentage relative to the original size. You can reposition and even overlap graphics by dragging them. Like a drawing program, DeskWrite has Bring to Front and Send to Back commands to control how graphics overlap. There are text-wrap and standoff-distance controls, but all graphics automatically paste as rectangles, so there is no way to wrap text around irregularly shaped graphics.

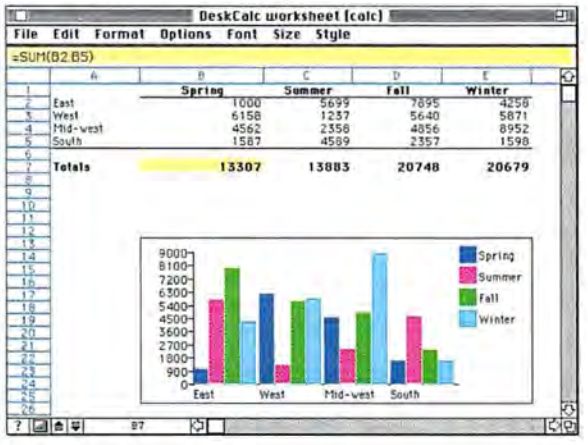
DeskWrite prints mail-merged letters, using data from a DeskFile database. Both the database and the DeskWrite document must be open together, and for each database field you want to include, you must enclose its exact field name in international quotes («»). Mail-merging is much easier in Works, because you select the fields you wish to merge from a window; there is nothing to remember or type.

Appointments. DeskSecretary reminds you of upcoming events. You enter the text that your Mac is to display at a future time and enter the date and time it should appear. You can optionally instruct DeskSecretary to remind you in advance of the event, to give you time to get to your appointment. A reminder can be set to repeat hourly, daily, weekly, every two weeks, monthly, quarterly, or yearly. As long as your Mac is on, a dialog box with your reminder will appear, at the specified time, on top of whatever application you're currently running. If your Mac is off, the alert will appear immediately the next time you boot up. You can just acknowledge the reminder (deleting it) or tell DeskSecretary to remind you again later. Repeating reminders are automatically reset to their next interval.

DeskSecretary does a wonderful job of mimicking JAM Software's Smart Alarms, but the improved Smart Alarms version 3.0 and CE Software's Alarming Events are both better schedule keepers than DeskSecretary.

Communication. DeskCom is a basic communications program that is similar to the original MockTerminal DA. It sends and receives either text or Xmodem files in the background, with or without MultiFinder. Contemporary file-transfer protocols such as Xmodem/1K blocks, Ymodem, and Zmodem are not supported. DeskCom stores as many as nine phone numbers, each with its own settings. If it senses a busy signal, it will redial repeatedly until a connection is made. Its simplicity makes it ideal for users who are new to telecommunicating. There is, however, no macro or scripting language to automate log-on, password entry, and downloading of E-mail and new files — features you find in heavyweights such as White Knight, Smartcom, and MicroPhone.

Numbers. The DeskCalc worksheet encompasses 1,000 columns by 2,048 rows. It provides 45 formula functions. There are no macro or scripting capabilities, but it provides enough power to satisfy most users. DeskCalc's operation



DeskCalc may not be in the same category as Excel or WingZ, but it has enough functionality for most users. It isn't as good as the spreadsheet program in Works, however, and not being able to open more than one spreadsheet at a time is a serious handicap.



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and capabilities are roughly equivalent to those of Works' spreadsheet program, but DeskCalc runs slower and can open only one spreadsheet at a time.

Data. DeskFile is a disappointing database manager. Although you can create as many as 250 fields per record and 10,000 records per file, only four field types are supported: text (up to 250 characters), numeric, picture, and long text (up to 32K). Date and calculated fields are not supported, and you can open only one file at a time. Although DeskFile can sort database files on up to three fields, each in ascending or descending order, it sorts and searches only on the text and numeric fields. You can't locate a phrase you entered in a long text field.

In testing DeskFile, I duplicated a user-group membership list and a sales-record database I've kept in either Works or Preferred Publisher's DAtabase DA. DeskFile could not properly sort members in the membership list by their renewal date. Those whose renewal dates fell in October, November, and December were sorted between January and February, because the numeric equivalent for those months begins with 1, which is less than February's 2. If DeskFile supported date fields, this problem would never have occurred. In the sales database, the lack of calculated fields prevented DeskFile from multiplying a quantity of time by an hourly rate or subtotaling the prices of several items and computing the sales tax and total.

There are some nice things about DeskFile. Three views are supported: form (a separate index card for each entry), list (a spreadsheetlike listing), and label (for mailing). You needn't mail-merge to a word processor to print mailing labels — DeskFile does it directly. Unlike in Works, entries wrap to the current width of the field and text fields can be multiple lines. You can customize the form and mailing-label views, using DeskDraw. DeskFile's ability to accept any graphic from the Clipboard lets it serve as a substitute for the Scrapbook.

The Bottom Line. Even though DeskPaint, DeskDraw, and DeskWrite justify the price you'd pay for Desk, I still prefer Works as an integrated package. As a second-generation product, Works achieves its strength through the close integration and matched capabilities of its modules. Desk is a collection of seven variable-quality DAs, none of which integrates with the others as well as Works' modules do with each other. Also, DeskCalc and DeskFile need serious overhauls before they'll be useful.

— Darryl Lewis

Get Info

Desk

★★★½

Published by: Zedcor, 4500 E. Speedway, Suite 22, Tucson, AZ 85712; (602) 881-8101.

Version: 1.0.

List Price: $399.95.

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Global Village's TelePort is a unique 2,400-bps, ADB modem that works beautifully and saves you a serial port.

Modem prices have been steadily declining. In 1984, a decent 1,200-bps modem set you back $500 or so. And 1,200 bps was the top reasonable speed. Not only were the few 2,400-bps modems outrageously expensive but all the pay-by-connect-time services (such as GEnie and CompuServe) also had whopping 2,400-bps surcharges.

That's changed. You can now buy a 2,400-bps modem for less than $100, and surcharges for 2,400-bps on-line services are mostly history. No one should consider buying a modem slower than 2,400 bps. Not all 2,400-bps modems are created alike, however, and modem quality translates directly into ease of use and time saved (see "Thoroughly Modern Modems" in this issue).

A recent addition to the ranks of 2,400-bps modems is Global Village's TelePort. Its price is excellent, and its performance is solid. Small and very light, because an external power source or transformer is not required, it's an excellent modem choice to take on the road.

A Free Port. What really makes the TelePort an excellent 2,400-bps modem is that it doesn't require a serial port to work. The TelePort connects to any ADB port (so it's unusable on Pluses or earlier Macs). The ADB seems to be a bit sensitive, at least in my setup, and the TelePort worked perfectly while plugged into a port on my keyboard and less well when plugged directly in to the Mac. There's

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EXCLUSIVE! VolumeBackup™ Software With Every Drive.

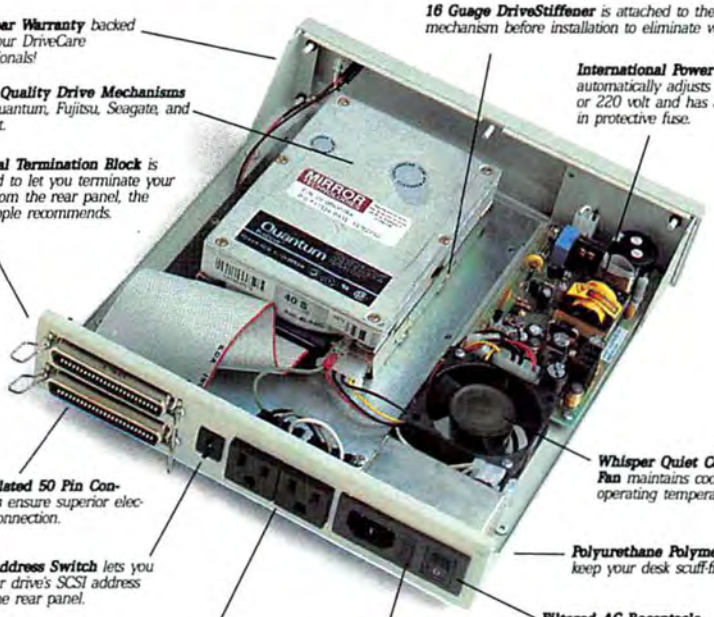
VolumeBackup's sophisticated scripting feature lets you create custom backup procedures that automatically back up your data when it's most convenient (like when you sleep). Back up to floppies, tape, another drive, or a SyQuest cartridge.

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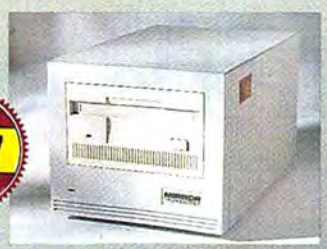
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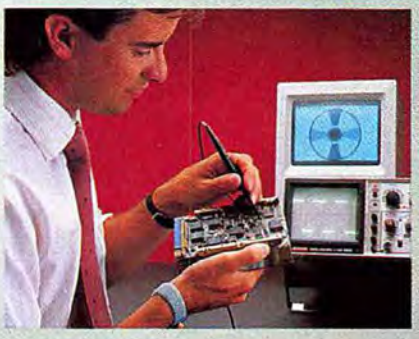
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M45(f)	45Mb	$367	$ 447
M80(s)	80Mb	$447	$ 497
M80(q)	80Mb	$597	$ 647
M90(f)	90Mb	$527	$ 597
M105(q)	105Mb	$647	$ 697
M130(f)	130Mb	$747	$ 797
M180(f)	180Mb	$847	$ 897
M325(f)	325Mb		$1797
M650(f)	650Mb		$2297
RM42	45Mb		$ 627

(s) = Seagate, (f) = Fujitsu, (q) = Quantum

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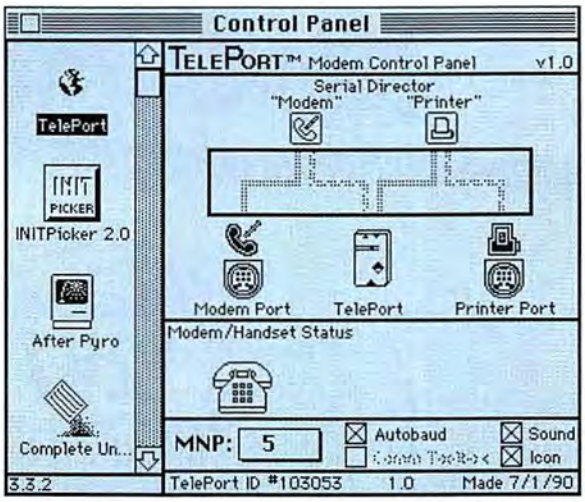
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Please circle 107 on reader service card.



The TelePort's Serial Director cdev lets you turn the serial ports on or off from the Control Panel.

no apparent reason for that, but that's the way it worked.

The ADB has a bandwidth of about 6,000 bps. The TelePort itself uses 4,800 bps, leaving 1,200 bps for the keyboard and pointing device. In theory, a speedy typist could see a tiny performance degradation, but in reality there are no ill effects.

Speed tests (modem races) on a wide variety of file types in Mac-to-Mac and Mac-to-on-line connections showed excellent results. Both straight-text transfers and protocol transfers ran at full speed virtually all the time. Whenever the other end of the connection could support 2,400 bps, the TelePort kept up easily.

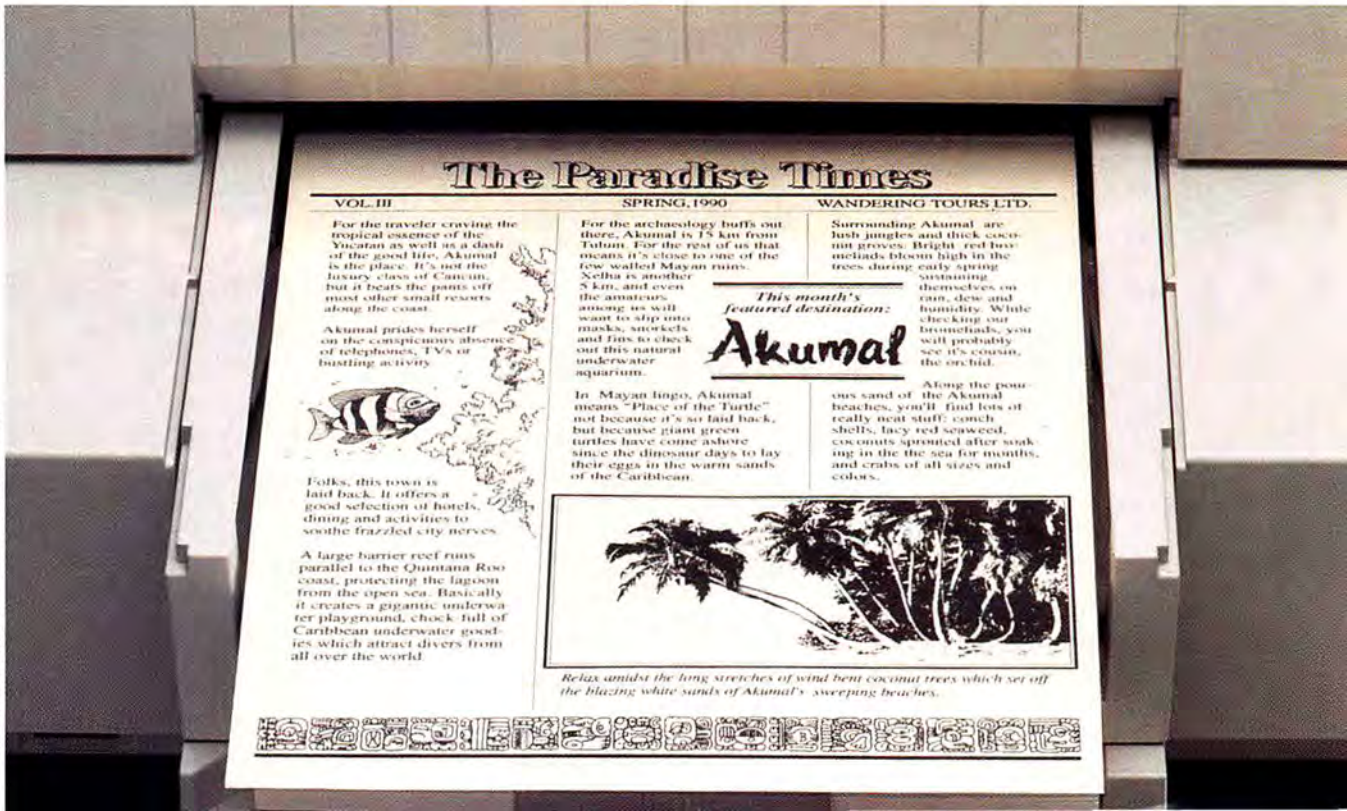
The TelePort offers MNP (Microcom Networking Protocol) Level 4 error correction and MNP Level 5 data compression/error correction as options. These can be very useful in some cases, but they can degrade performance if used carelessly. CompuServe connections work best, for example, when both MNP options are turned off.

A nicely designed INIT/cdev, controls your serial ports. It didn't conflict with any of my other INITs and cdevs, which include some notorious troublemakers. To select your setup, simply click on the desired connections.

The software adds a panel to the menu bar that gives information traditionally supplied by LEDs; it also shows the connection speed and the actual number of characters transmitted (in both directions) per second. I wish that all modems could display such a useful panel.

The manual says that Smartcom II —

With the HP DeskWriter, you can



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Documents created using Microsoft® Word and Aldus PageMaker.*
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PageMaker is a U.S. registered trademark of Aldus Corporation.

the telecommunications software that ships with the TelePort — doesn't allow the printer port to be shared with AppleTalk. That's the only error I found — the latest versions of Smartcom work fine. This manual is notable for its excellent design and superb clarity — it's so good that other manual writers could use it as a model.

Registration for domestic users is automated. When you first use the TelePort, it tells you whether it is hooked up correctly and whether you've registered it. To register, you simply fill out a simple dialog box and click on the Do It button. The software then makes a quick call to a toll-free number and registers you. Neat.

Support is available by phone and via America Online. A free America Online startup kit is included so you can reach Global Village there.

The Bottom Line. Planned TelePort enhancements include a 4,800-bps, Group III-compatible, send-only fax package and an address book/dialer. Both are software-only add-ons and will cost $60 each. The fax software should be available by the time you read this, and the address book should have been out by the end of 1990.

The TelePort comes with a short (9.5-inch) telephone cable and a wall mounting plate. It isn't the fastest modem you can buy, but there's more to it than sheer speed. It's the best 2,400-bps modem I've ever used — and that includes all the excellent Hayes and US Robotics units.

— Steven Bobker

Get Info

TelePort A300

★★★★½

Manufactured by: Global Village Communication, 1204 O'Brien Drive, Menlo Park, CA 94025; (800) 736-4821 or (415) 329-0700.

List Price: $225 ($149.95 direct from manufacturer).

MULTIMEDIA

HookUp!

HookUp! is the software equivalent of an electronic multimedia hobby kit.

HookUp! is billed as an iconic software kit for the Macintosh. Although the folks at Hip Software would like you to think of it as a software erector set, a better comparison might be with the hobby-shop electronic-module kits of years past.

You remember those things: By plugging various electronic parts into a perforated circuit board, you could assemble radios, lighting networks, sixth-grade science-fair projects, and so on. None of the resulting devices worked terribly well — certainly your mother wasn't about to

have it all. (But keep it to yourself.)



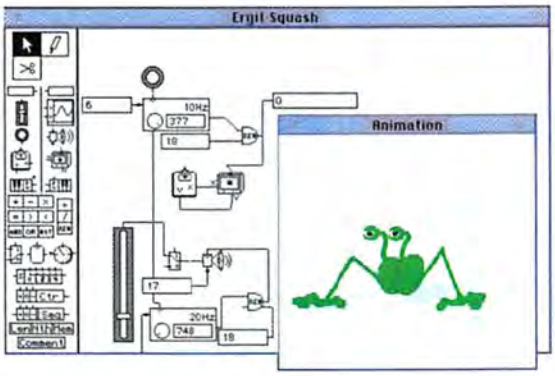
The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and Apple Talk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call **1-800-752-0900, Ext. 1004** for your authorized HP dealer.

There is a better way.

HEWLETT PACKARD



Ergit — a green, squashy sort of creature — is one of the characters you can animate in HookUp!, the software erector set from Hip Software. The Network window shows all the connections required for Ergit to schlump his way across the Animation window.

let you rewire the kitchen based on the experience — but the murky concepts of electronic input and output became clearer.

Electronics Project. Using this analogy, HookUp! provides icons representing input and output modules, along with intervening switches, memory modules, clocks, and arithmetic and logic functions for creating simple software routines. These mini-applications can perform a variety of functions, such as generating musical or visual output that responds to keyboard input or mouse movements. You can also create feedback loops so that the on-screen visuals respond to musical output or vice versa. For example, you could link a happy face to the notes in a major triad and a sad face to the notes in a minor triad. Input is available through number boxes, sliders, buttons, mouse-input boxes, and MIDI. The output appears in number boxes and graphs, as sounds and animation included in the program and as MIDI Out data.

You activate all icons by dragging the desired part from the icon palette to an open work space called the Network window. You then plug the different icons together with graphic "wires," which you draw with the wiring tool. HookUp! also supplies a scissors tool for severing any unwanted connections.

It's easy to understand the simple relationship between input and output devices. For example, drag the mouse-input icon to the window. Connect output boxes to the x- and y-axis outs on the mouse icon with the wire tool. The resulting numbers appearing in the output boxes indicate your horizontal and vertical mouse positions. If you have a MIDI instrument and interface, try connecting input number boxes to the MIDI-output icon to select the note and determine the velocity at which your synth will play. To

With the HP ScanJet Plus, you've

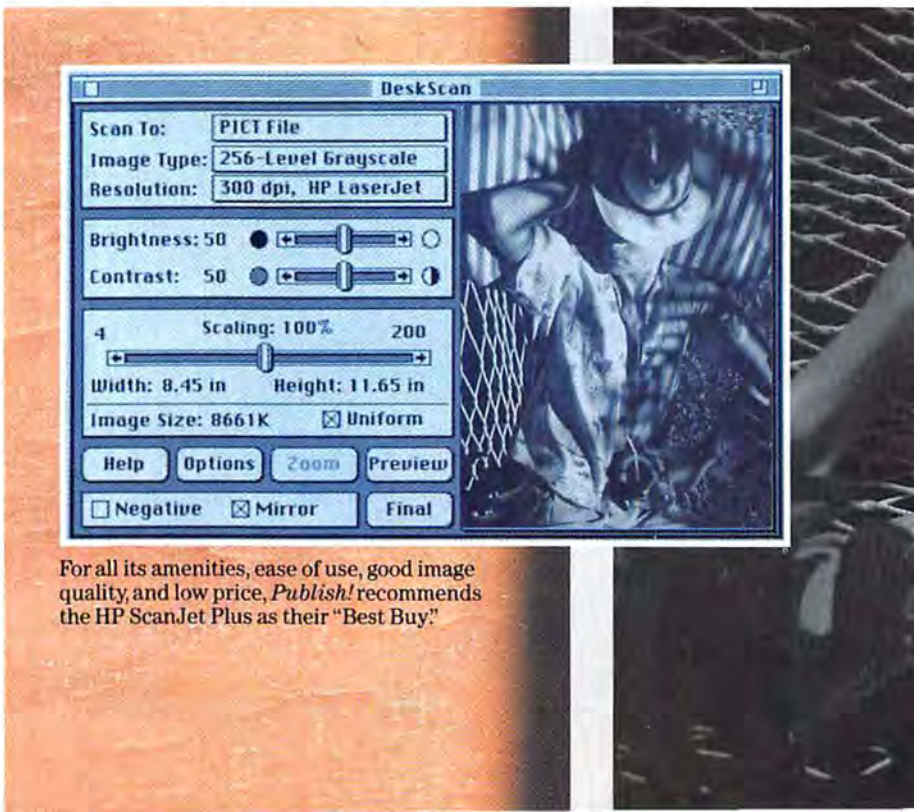
The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190,* about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call **1-800-752-0900, Ext. 1005** for your authorized HP dealer.

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For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."

trigger a MIDI event in this configuration, attach an on/off button to the MIDI-trigger input.

Want to add animation? Simple. HookUp! includes animation cels (frames) created with MacroMind's VideoWorks II. By making the right connections, you can design small multimedia programs that include sound and animation. With little effort, I was able to make Ergit — a green, squashy sort of creature — tango across the screen to the accompaniment of the Pink Panther theme. Not a terribly useful routine but fun to make.

A Short Circuit. Learning the basics of HookUp! is not difficult. The manual contains a short tutorial that walks you through a simple animation exercise. The rest of the manual is devoted to a somewhat terse explanation of each icon's function. The program disk includes examples of each icon working on a rudimentary level as well as in combination with others to form more-sophisticated structures. With the tutorial and software examples, you should be able to work through simple to intermediate tasks. Although HookUp! allows the creation of more-complicated networks, programming novices may find these routines intimidating. The manual could be improved by an expanded tutorial detailing the building of complex routines.

The Bottom Line. HookUp! only hints at things to come. There are severe limitations in the kind of software you can put together. You can't create your own animation without using VideoWorks II or MacroMind Director, so your immediate choices are limited to that green, squashy thing; a toddling pterodactyl in sneakers; a bouncing olive; and a few geometric and musical shapes. The supplied sounds are unlikely to cause Brian Eno to hunt for a day job, and the MIDI implementation is limited. This is not the package to use for that big sales presentation at MegaBucks Corp.

The point here is not the usefulness of anything you might create with HookUp! — it's the process of putting it together. After all, how great was the fidelity of that radio kit you assembled for the science fair? HookUp! introduces the basic concepts of programming in a nearly failure-free environment. You may become so enamored of building routines that you dash down to the local junior college and enroll in a programming class. Perhaps, in the near future, you'll even learn to design an extensive icon-oriented language that has some practical application.

— Christopher Breen

Get Info

HookUp!
Published by: Hip Software, c/o CTM Development, 1013 S. Claremont, Suite 1, San Mateo, CA 94404; (415) 573-8945.
Version: 1.01.
List Price: $149.

got it made in the shades.



*Suggested U.S. list price. ©1990 Hewlett-Packard Company PE12004

PROJECT MANAGEMENT

Project Scheduler 4

Scitor's organizational powerhouse shows its developer's DOS roots a bit too much.

If you think you missed Project Schedulers 1 through 3, you're right — unless you also manage projects with a PC. Project Scheduler 4 is Scitor's first entry into the Mac project-management arena, and it brings some formidable features to the race. Unfortunately, it also brings some unintuitive DOS habits along for the ride.

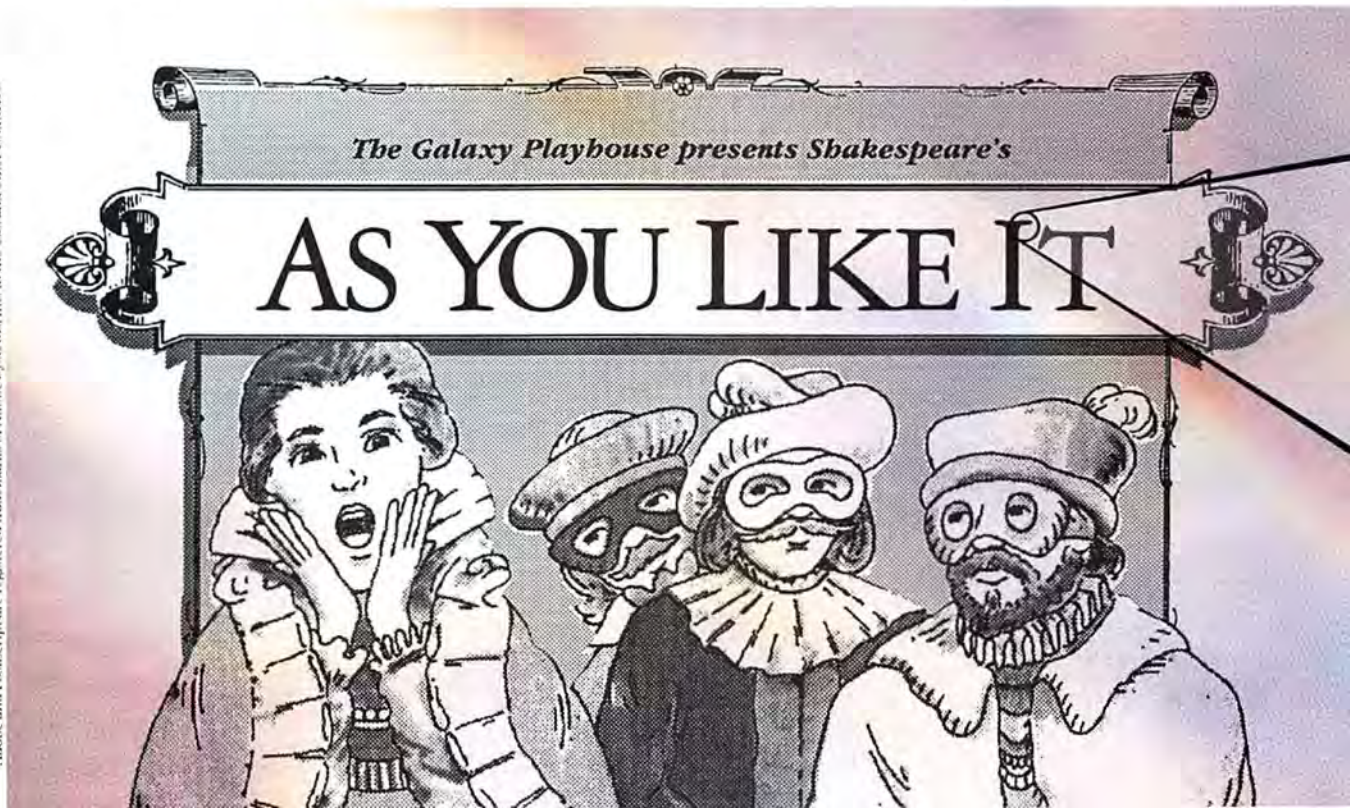
DOS Project. From the second you start a new project, you are immediately struck by the program's awkwardness. The first things you see are empty graphics windows for Gantt charts and PERT networks and a Job Template window. MacProject or MicroPlanner hacks would probably click in the network diagram (the graphics windows) and quickly become frustrated when nothing happened. Although you can perform some management functions (such as changing dates) by using graphics, most of Project Scheduler 4's interface would be just as appropriate in the character-based DOS world.

But interfaces aren't everything. Project Scheduler 4 has an impressive list of features that hard-core project managers should find appealing. Rather than simply stringing tasks together, it expects its users to organize their tasks in a WBS (Work Breakdown Structure). WBS is a standard project-management tool that helps define the granularity of a project, but all the work of categorization and division must take place outside the program. In fact, most of your thinking needs to take place outside the program.

After you've performed a few Mac-like functions, such as giving the project a name and defining the calendar, Project Scheduler 4 begins its serious work in tables, which it uses to define resources. Resources cost so much per h and are usually available 5 ds a week —Project Scheduler 4 uses cryptic codes (*h* is for hours and *d* is for days). After defining your resources, you enter project tasks in a similar table that uses WBS, RBS (Resource Breakdown Structure), and OBS (Organization Breakdown Structure) codes in addition to ds and hs. The system does have the virtue of ignoring most incomplete fields, so you can add your codes later (or not at all) if you wish.

Once you've agonized over entering your information into tables, it's time to structure your project in time. Unfortunately, creating task dependencies is as nonintuitive as most of the program's

With the HP LaserJet III, you can



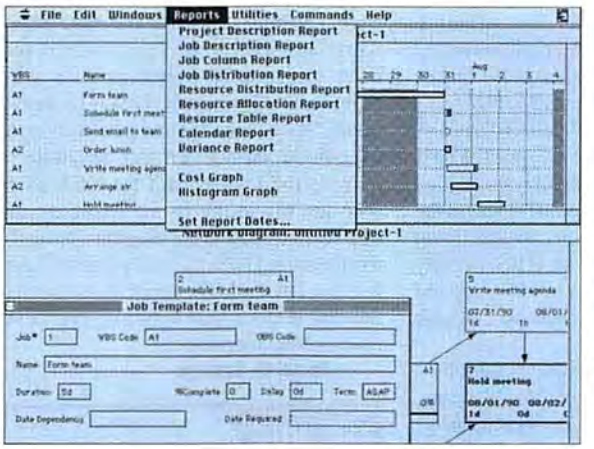
© 1990 Hewlett-Packard Company PE12000
*Serif depicted conceptually represents the benefit of variable dot sizes.
†Suggested U.S. list price for full Macintosh configurations including minimum required memory.
Adobe and PostScript are registered trademarks of Adobe Systems, Inc. in the U.S. and other countries.

other functions. Rather than just drawing in the Network Diagram window, you must first highlight the item in the job table and then double-click on the network diagram to place the items. Drawing from a task box into a blank area in the PERT-chart window does create a new task, but clicking or double-clicking on the task does not activate the job template. You must search through the maze of windows to find the job template so you can define your new task.

Once you have your tasks defined over time, you can also see time lines, or Gantt charts, that display the duration of tasks and how much progress has been made to date. Various reports — such as the Job Column Report, Job Distribution Report, and the Resource Allocation Report — are available from the Reports menu. All Project Scheduler 4's reports sound like standard MIS reports — and they look like them too.

Talent Shows. Project Scheduler 4's greatest talent is its ability to link multiple projects based on WBS codes. Individual files, created by their WBS managers, can be combined in memory to create consolidated projects. The program can work around the availability of people and other resources through its active resource-leveling routine, and it automatically shifts dates to help accommodate overloaded resources.

Project Scheduler 4 displays actual versus planned information differently from the way other project-management programs do. Rather than having you input actual dates, Project Scheduler 4 saves a baseline plan as a snapshot of the project. Changes to the scheduler are then reflected as "actuals." You can also show what percentage of a task is complete and even track actual versus planned



Project Scheduler 4 is a project-management program that employs graphics to illustrate project time lines and task dependencies. If you need Project Scheduler 4's unique abilities to use WBS and OBS codes or to bring multiple projects into memory, be prepared to work for that pleasure.

refine your characters.



The HP LaserJet III printer delivers the most refined 300 dpi print quality ever. And it's easy to use. When configured with Adobe® PostScript® and AppleTalk interface, the LaserJet III is completely compatible with your Macintosh. All for only $3,700†.

HP offers other Macintosh compatible LaserJets. The new LaserJet IIID printer with increased paper-handling capability for $5,125†. And the affordable LaserJet IIP printer for only $2,595†. Call **1-800-752-0900, Ext. 1168** for the name of your nearest authorized HP dealer and ask for the Macintosh versions of the LaserJet line.

There is a better way.

HEWLETT PACKARD

costs after adjustments for inflation. However, this baseline method (reflected in reports and Gantt charts only) makes visualizing plan changes difficult.

Because of Project Scheduler 4's heavy reliance on codes, I'd like to see the next version include visual displays of coded items. A visual editor would represent the project as a tree or outline, broken down by time, WBS, OBS, or RBS. In any particular view, items could be moved about into new categories or subtask structures.

The Bottom Line. Project Scheduler 4 is meant for dedicated project planners, not for average managers. Most managers can get along with MacProject II for heavy-duty work or with one of the Gantt-chart-publishing programs, such as FastTrack Schedule. Most of the coded breakdowns in Project Scheduler 4 require too much work and maintenance for average managers—and the interface makes them even more difficult to use. Project Scheduler 4 is required only when you need to break your tasks down into rigid reporting structures and have others work on portions individually or if you need to work or exchange files with Scitor's DOS versions. Given its heavy dependence on codes and generally non-Mac-like interface, Project Scheduler 4 may be the logical path for DOS users who are migrating to the Mac. On the other hand, since Mac users are unlikely to migrate to DOS, they may feel stranded in a foreign land. The program is promising, but it has a long way to go before it finds a Mac identity.

— Daniel W. Rasmus

Get Info

Project Scheduler 4

★★★½

Published by: Scitor, 393 Vintage Park Drive, Suite 140, Foster City, CA 94404; (415) 570-7700.
Version: 1.0.
List Price: $685.

BetaWatch

Products on the Horizon

Animation Works is the first Mac product from Gold Disk, a successful Amiga developer. A low-priced (slightly less than $200), 8-bit animation package, Animation Works is aimed at users who are interested in exploring animation but don't want the complexity of a program such as MacroMind Director. Its animations are created with the Cel, Background, or Movie editors. The Cel editor includes tools for ensuring proper registration and a draw environment for creating characters. The Background editor is a paint environment for creating backgrounds. The Movie editor is where you put together the animation, by incorporating motion paths, characters, backgrounds, and even gravity. Animation Works doesn't support interactivity, but it offers a variety of editable wipes, traveling mattes, and runtime players for the Mac and DOS machines. With the introduction of Apple's low-end

Pigments for your imagination.

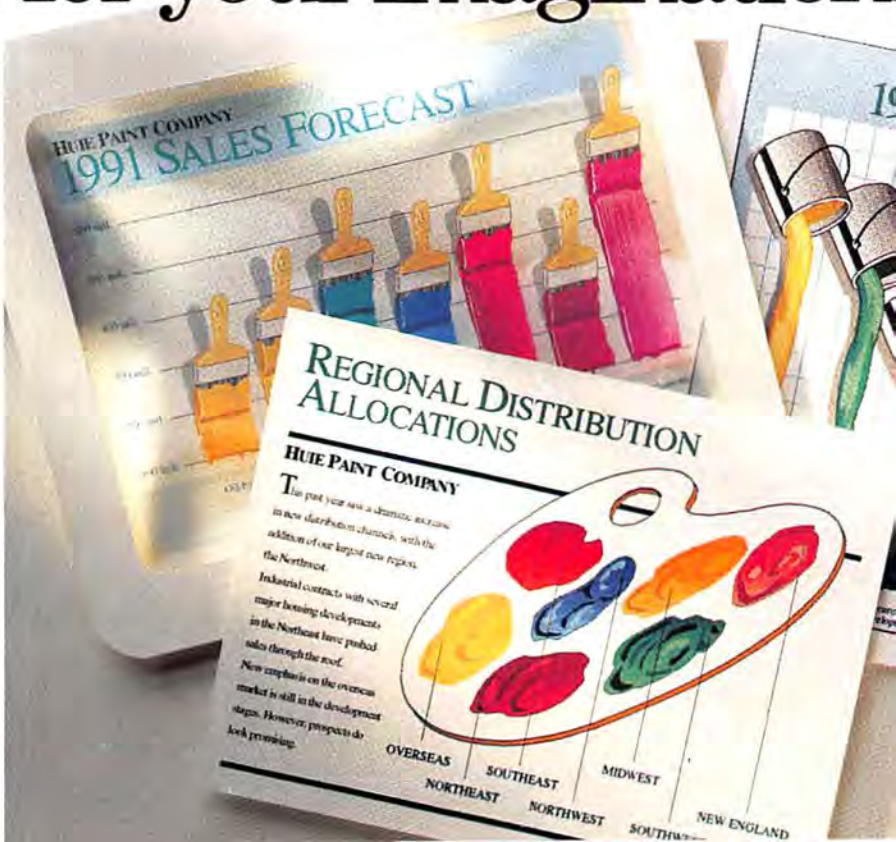
HP color printers let you draw splashy color from your Macintosh.

Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call **1-800-752-0900, Ext. 1167.**

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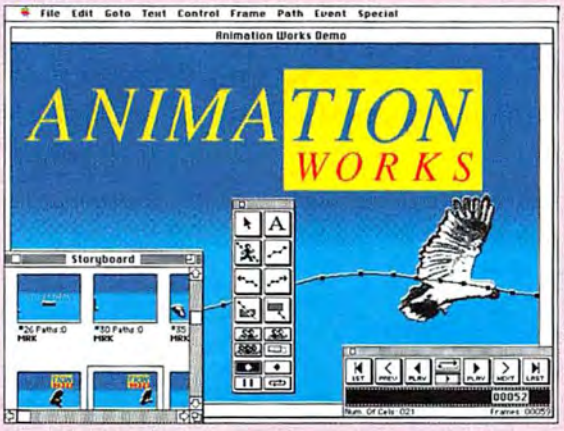


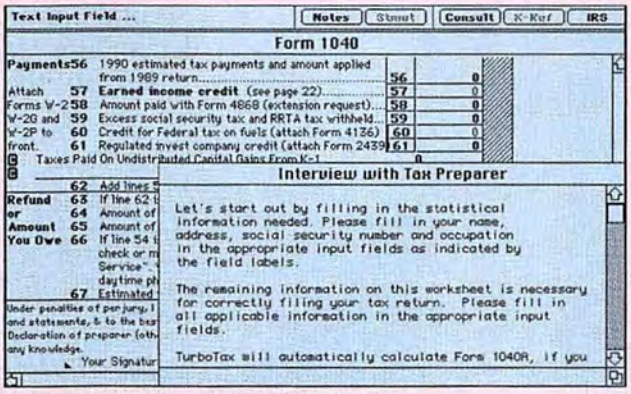
color machines, Animation Works may prove an ideal addition to a beginning graphics software library, since there are no other color animation packages anywhere near its price.

Gold Disk, 20675 S. Western Avenue, Suite 120, Torrance, CA 90501; (213) 320-5080. $199.95. ETA: November 1990.

TurboTax is a new tax-preparation package from ChipSoft, a successful PC software developer. Instead of simply providing tax forms, TurboTax includes tax-consulting functions that question and prompt you for the proper information, as well as extensive help files that provide plain-English explanations of the tax requirements at each stage. TurboTax can import MacInTax files and can also exchange data with Quicken. In addition to the federal forms, ten state packages are available.

ChipSoft, P.O. Box 85709, San Diego, CA 92186; (619) 587-3939. Federal forms, $89 each; state forms, $49 each. ETA: November 1990.







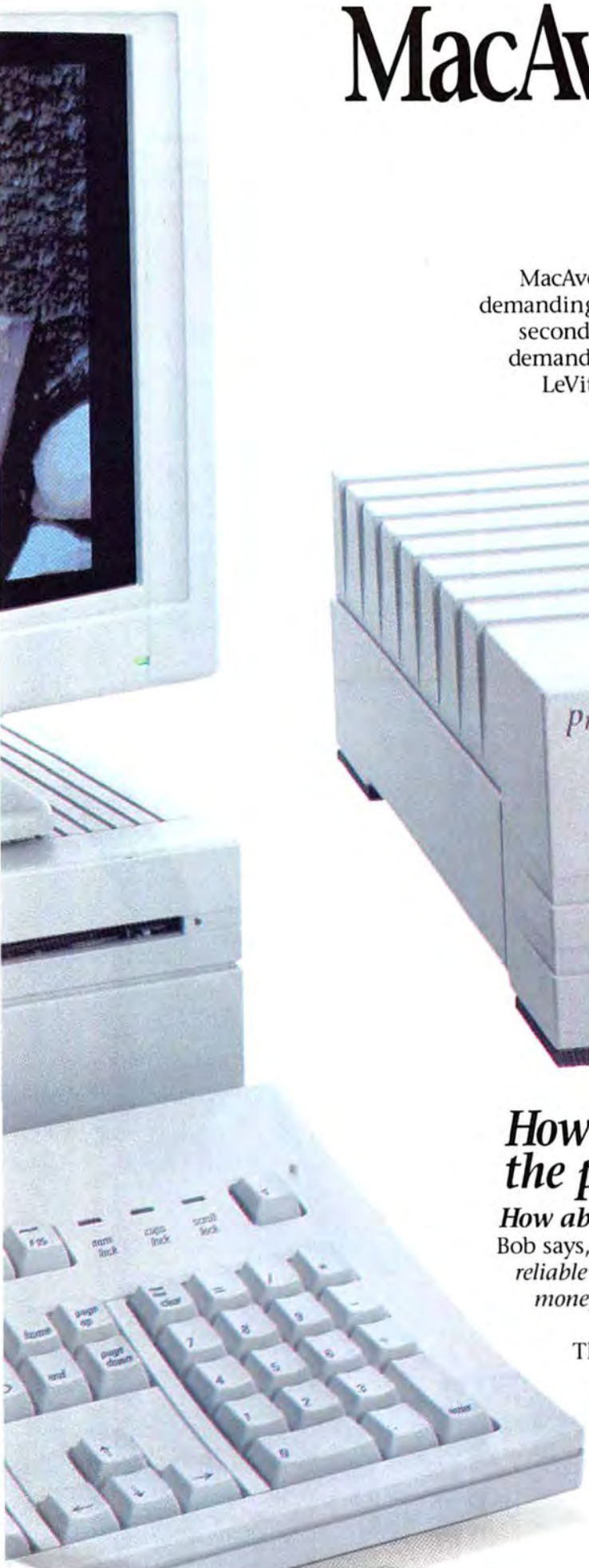
MacAvenue's Protegé



Bob LeVitus, author of Dr. Macintosh, *recommends the Protegé drive.*

. . .Dr. Macintosh That is

MacAvenue's Protegé drives meet the most demanding performance expectations. Want a second opinion? Listen to one of the most demanding Mac users, Bob ***"Dr. Macintosh"*** LeVitus, the guy who wrote the book on mastering the Macintosh.



How would you describe the perfect hard drive?

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Bob says, *"I like my Protegé drive – a lot! With a fast and reliable mechanism, low price and a no-questions-asked, money-back guarantee, what's not to like?"*

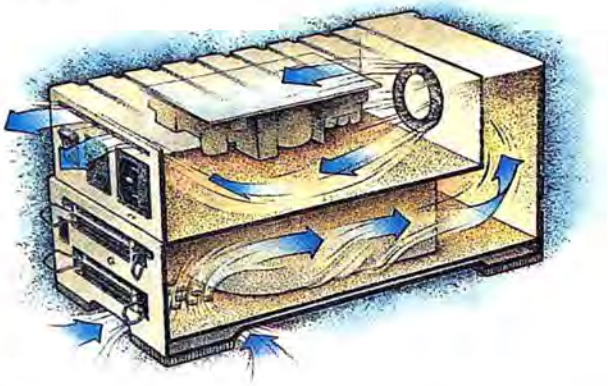
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HOW I LEARNED TO STOP WORRYING AND LOVE CONNECTIVITY: NETWORKING THE '90s

What to expect in this decade — and how connectivity, interoperability, interapplication communications, and other polysyllabic powerhouse technologies will help you through it all.

BY JOHN RIZZO AND JON ZILBER

The '80s were the Me decade of personal computing. Individual computer users gained capabilities that used to require data-processing specialists, and vendors latched on to phrases such as *personal empowerment.*

But if the '80s were the era of desktop publishing, desktop engineering, and desktop just-about-everything-else, the '90s will be the decade that connects all the desktops: the Us decade. And just as Macs are no longer the only machines with desktop user interfaces, Macs will no longer be connected just to other Macs. Networks will embrace Macs, PCs, UNIX workstations, minicomputers, and mainframes.

You don't have to be an MIS jock to love connectivity. If you think connectivity is merely a necessary evil that your network manager takes care of, you've missed the point. If you share electronic information of any kind — text or data files, graphics, page-layout templates, schedules, E-mail, and so on — with other computer users, you have a vested interest in making the most of your network connections. The products and technologies of connectivity have become an integral part of everything from Apple's forthcoming System 7.0 to "hot links" among application-software packages to compression features that let you squeeze large graphics and video files into fewer bytes.

In other words, *connectivity* is maturing from just a buzzword to the single most important competitive tool of business computing.

As with the uniting of the European Communities, the force driving this coming together of computerdom is not altruism but self-interest. Mac users will gain access to vast amounts of data and computing power without even having to be aware of what type of machine they are accessing. More and more companies will become part of an emerging "GlobalNet" — a United Nations of corporate, academic, and government databases and information networks.

PHOTOGRAPHY: PATRICK BARTA



The GlobalNet is not a product or a specific communications protocol; it's more of a Platonic ideal. In it, all the public and private participants will maintain their own discrete local networks, but — as with the commerce among member nations of the United Nations — each member network will be able to import and export data, translate documents into any GlobalNet language, adapt to foreign protocols and standards, and generally allow any citizen on any network to communicate with any other citizen on any other network.

As with the United Nations, it's a tall order, and it won't all happen overnight. But bit by bit, the GlobalNet is moving toward reality.

If you've been using computers since pre-PC days, the GlobalNet concept may sound like a throwback to those repressive and tyrannical days of centralized data-processing departments. And it might conjure up images of Big Brother or of an era in which an information-rich elite controls society.

But the emerging GlobalNet is likely to be more democratic than the situation in the '60s and '70s, when MIS dictators determined what hardware and software people used. Individual users will continue to decide what machine and what software are best for their tasks. The role of the GlobalNet — and of the MIS department — will be to connect users to the rest of the world, regardless of what box they have.

This is no mere technological fantasy — it's a revolution in progress.

Apple has been ready for the revolution — indeed, it has been rallying the rebels — since the early days of the Mac. Connectivity is built in to both the hardware and the operating system, with more tools on the way in System 7.0. Apple's alliance with DEC has finally borne fruit with LanWORKS, which gives Mac users easy access to VAX data.

Unlike the isolationist world of IBM PC-compatibles, in which networks are still the exception, the Mac world

Figure 1: Ethernet versus Token Ring

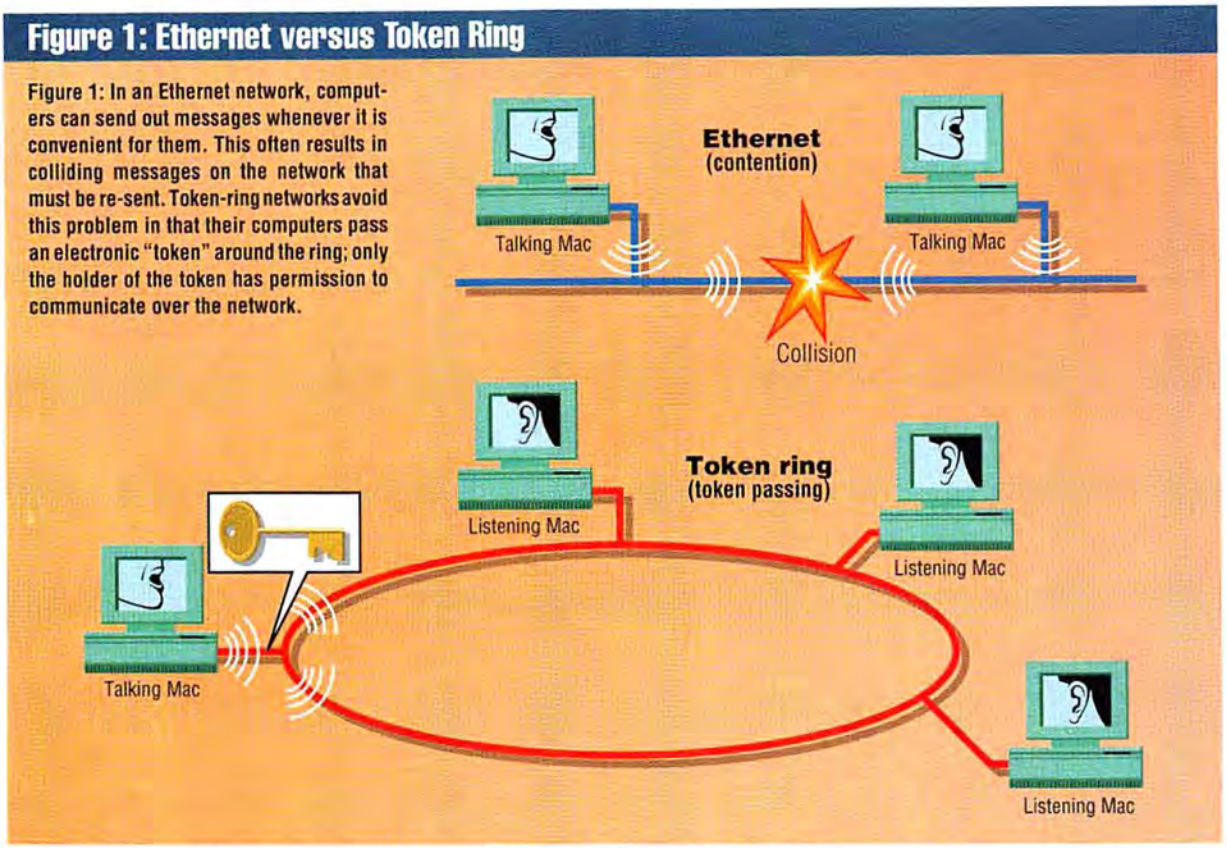


Figure 1: In an Ethernet network, computers can send out messages whenever it is convenient for them. This often results in colliding messages on the network that must be re-sent. Token-ring networks avoid this problem in that their computers pass an electronic "token" around the ring; only the holder of the token has permission to communicate over the network.

is mostly populated by machines that already belong to a network. In fact, since it's easier to connect a PC to a Mac than to another PC, the new low-cost Macs may even find new markets — as PC-network managers!

OK, so how should you get ready for the revolution?

That's a question we at *MacUser* started asking ourselves about two years ago. That's when technical director Henry Bortman started planning and developing the MacUser Labs NetWorkShop (which moved into its state-of-the-art permanent quarters, shown in the accompanying photo, this past October). The NetWorkShop — filled with Macs, PCs, VAXes, Sun and NeXT workstations, and networking hardware and software from all the major players — is a LAN researcher's dream come true.

If you don't have half a million bucks to set up your own test facility, keep an eye on the monthly Bridges section for the latest in connectivity news. This month you'll find lab reports on A/UX (Apple's own version of UNIX for the Mac); APIs (software that lets your Mac access mainframe databases); and some of the basic workhorses of connectivity, 2,400-bps modems.

There are three categories of products — incorporating three key technologies — with which you need to be familiar. The most obvious category comprises physical connections. Like indoor plumbing, the products in this category aren't the most glamorous — but you can't live without them.

The second area is the ways of sharing services among machines. File serving, E-mail, and print serving are just some of the services now appearing on multiplatform networks — but only after bridges have been built between Macs and other types of computers.

The final challenge is getting the network to work as a single well-tempered machine. This includes getting Macs, PCs, and other machines to communicate harmoniously with one another. It also includes the complementary challenge of getting each piece of System software and every application residing on an individual Mac to work in concert with every other piece of software so that the whole is greater than the sum of the parts.

Within these three general categories — physical connections, the sharing of services with foreign services, and the seamless integration of every computer with every other computer on the network (including itself) — lie countless competing technological issues, solutions, and products. Here's a primer on some of the hottest areas the NetWorkShop will be investigating in the coming months in each of these three categories.

Connecting Machines

The Mac has built-in network-access capabilities; configuring a simple LocalTalk network can be a mere matter of running wires among Macs, printers, and other peripherals.

This is a mixed blessing. It makes life simple, but it does so by promoting a low-end, limited solution. Before your network starts slowing to a crawl, the first step toward upgrading it for the '90s is to rethink its wiring, topology, and capacity for higher bandwidth.

Ethernet versus Token Ring. On IBM PC-compatibles, there isn't any built-in networking — which means PC users have to pay for add-in boards to do simple things (such as hook up a printer) that Mac users take for granted. But once they're forced to reach into their pockets, many PC users are willing to dig a bit deeper. As a result, most UNIX and VAX networks, as well as many PC networks, use Ethernet, which provides a much faster connection than plain old LocalTalk does.

Ethernet is also fast becoming a popular upgrade option for Mac networks in which LocalTalk's transmission speed is a bottleneck. It's also becoming more affordable every year, with cards now in the $400-to-$500 range, with prices dropping rapidly.

But Ethernet isn't the only game in town. The token-ring topology, IBM's official method of networking PCs and mainframes, is a bit more complex and more expensive than Ethernet, but it has its advantages. Four-megabit-per-second token ring used to be in the shadow of Ethernet's 10-megabit-per-second speed limit, but interest in new 16-megabit-per-second token ring is growing.

There's a more fundamental issue at stake in the Ethernet-versus-token-ring debate: The key distinction of token-ring networks is that they are immune from a problem called contention. Ethernet and LocalTalk nodes send out a message on the network whenever it is convenient for each computer. If two computers send out a message at the same time, the messages collide and are destroyed, so the computers have to take the extra time to send out the messages again, thereby increasing the time it takes to get them across. The more nodes on the network, the more likely this is to happen, slowing the performance of the entire network. With enough nodes speaking at once, you get the equivalent of an angry British parliament, with nobody hearing anybody.

In a token-ring network, the nodes speak one at a time, only when they have permission. Permission is granted when the node receives an electronic "token" that is passed from node to node. The speed of the network depends on the speed at which the token is passed, which is very fast (see Figure 1). Token ring becomes more attractive as networks become bigger and more crowded with traffic. Discovering the precise point at which Ethernet contention becomes a problem will have to wait for an upcoming NetWorkShop report.

(Since we've told you where token ring gets its name, we should also explain the name *Ethernet*. It is derived from the 19th-century concept of the ether, the supposedly all-pervasive fabric of the universe, required for the propagation through space of light and other electromagnetic radiation. The ether concept, disproved in 1887 by the famed Michelson-Morley experiments, was a necessary component of various short-lived physical theories proposed to explain anomalous experimental oddities that ultimately prompted the development of quantum physics and relativity. Thus, *Ethernet* implies an all-pervasive network medium, a misnomer to the extent that token rings keep Ethernet from having a monopoly.)

10BASE-T. If Ethernet is the current monarch of network transmitters, 10BASE-T will become the monarch of Ethernet, replacing traditional Ethernet systems that use thick coaxial cabling. 10BASE-T is the IEEE specification that defines the type of cards, connectors, and hubs required to put Ethernet onto twisted-pair wire, which is also used for office telephone systems and most LocalTalk networks. Twisted-pair wiring is cheaper than the traditional Ethernet coaxial cabling (particularly if twisted-pair is already installed) and easier to configure (if it isn't), because it uses the time-tested tools and techniques of the telephone-wiring trade. And using existing properly installed wiring can help you avoid problems caused by retrofitting, such as putting the cabling into ceiling panels, where fluorescent lights take their toll on passing network signals.

Fiber Optics. If 10BASE-T is the connectivity freeway of the early '90s, the superhighways of the late '90s will be fiber optics — sleek speedways illuminated by billions and billions of twinkling points of light. We're not talking about Carl Sagan's stars or George Bush's volunteers but the pulses of light that can be transmitted over hair-thin, transparent strands of glass or plastic. The same technology that gives US Sprint crystal-clear long-distance phone connections is available for LANs (local-area networks). A fiber-optic cable can have a bandwidth several orders of magnitude higher than a conventional copper cable that conducts electrical signals. This kind of bandwidth means that big files — whether the full text of the collected works of Shakespeare, 32-bit-color graphics, or even full-motion video with sampled sound — can shuttle around a network in real time.

But optical cable by itself can't make your network go faster. Right now, a Mac network can't go any faster than the LocalTalk, Ethernet, or token-ring transmitters that send out data over it — regardless of a cable's bandwidth.

Fiber optics is useful for customized LAN-to-LAN connections in which multiple signals are multiplexed and sent en masse. But the big switch from electrical to optical transmission won't happen until optical transmitters and receivers are built directly in to the Macs and peripherals themselves.

Some LANs are already turning to fiber optics for reasons other than bandwidth and transmission speed. Optical cable has far less degradation of signals than does electrical cable, allowing for local-area networks that are not so local, stretching out over longer distances than are possible with wire. Optical networks are also more secure from electrical interference and unauthorized intrusions.

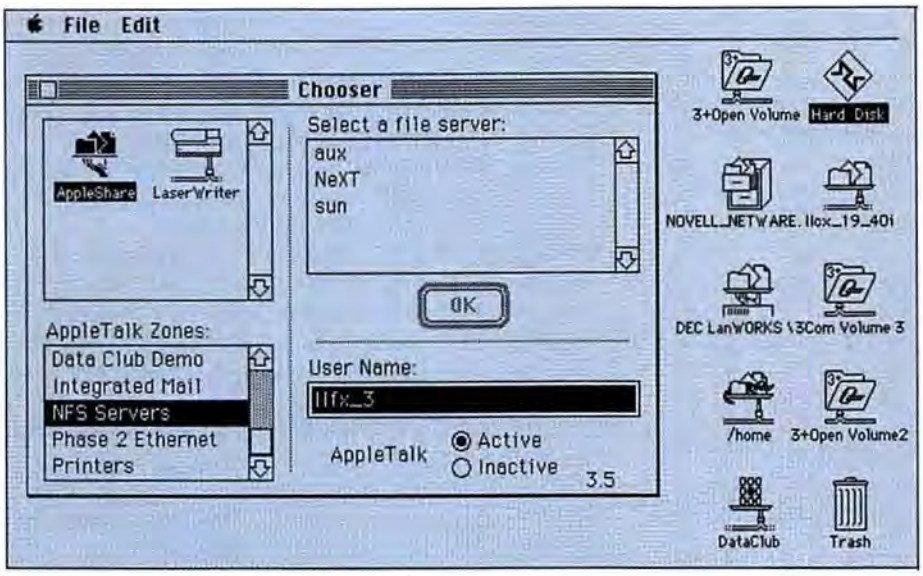


Figure 2: In the MacUser Labs NetWorkShop, we can mount many file servers through the Chooser. Shown mounted here on the desktop are a Mac server (AppleShare); several PC servers (3Com's 3+Open and Novell's NetWare); a VAX (DEC's LanWORKS); a Sun workstation (using Cayman's GatorBox); and International Business Software's DataClub virtual server, which resides on several Macs at once. To the user, all behave in the same way.

And fiber-optic cables are smaller than comparable electrical cables — an important consideration in high-rise office buildings, where elevators must sometimes be decommissioned because the elevator shaft is needed to accommodate the overflow in floor-to-floor cabling.

There is also a longer-range reason to consider optical cable today. Because of its capacity for high bandwidths, optical cabling will be ready for the successors of Ethernet that will come along 10 to 15 years from now, which may run at orders of magnitude faster than today's network transmitters. And since the cost of installing the wiring for a facility can run in the tens or even hundreds of thousands of dollars — far exceeding the cost of the cable itself — you just might want it to last a decade or two.

ISDN. ISDN (Integrated Services Digital Network) is a protocol for carrying both voice and data across long distances at high speeds through phone lines without the use of modems. In an ISDN world, bandwidth is always on tap, a standard utility — like running water, electricity, and phone service — at home and at work.

Those of us old enough to remember 1964 may recall the picture phones at the New York World's Fair. Like the flying cars of the 1939 World's Fair before it, picture phones became iconic symbols of the fair but never turned into a service that customers were willing to pay enough for to make a reality.

But with ISDN, practical picture phones are just the beginning. With integration of voice, data, and even video information, you can have freeze-frame picture-phone service running on your Mac while you're accessing and displaying mainframe data in another window.

Instead of using a modem to convert digital signals to analog for sending over a phone line, ISDN can transmit digital signals directly between computers in different cities. More digital signals than analog can be sent over phone lines, so an ISDN channel runs at 64,000 bps. ISDN can consist of multiple channels, offering total bandwidths of 144,000 bps and 1,540,000 bps. These kinds of bandwidths can let us access networks in distant cities the way we now access local-area networks.

Apple already offers an ISDN NuBus card for developers that runs on ordinary twisted-pair telephone wire (see "Coming Soon to a Mac Near You: ISDN," October '90, page 227), but the ball is not in Apple's court. ISDN won't become universal until the standards now forming are adopted by the telephone companies and until they've installed enough ISDN equipment to be able to offer it to the masses. The stumbling block is that the telephone companies are just beginning to upgrade *their* network equipment to make it ISDN-compatible. Until the telephone networks in your area — and in the area of the party you're calling — can handle ISDN, local ISDN hardware won't do you much good.

Multiplatform Networks

As our own NetWorkShop demonstrates, it's a multiplatform world. We have Sun, NeXT, VAX, DOS, OS/2, and A/UX machines integrated in our network. You probably work with a comparably mixed bag of machines — either physically connected; remotely connected via modem; or logically connected with files transferred via floppy, optical, SyQuest, or other media. Getting all the members of your extended network family to work together isn't impossible, but it requires dipping into another bag of connectivity tricks.

File-Server Access. After the physical connections have been made, one of the first things users of various platforms want to do is access each others' file servers. Unfortunately, each computer company has developed file sharing in its own way, so integrating the different worlds of AFP, IPX, and NFS (in English, that's AppleShare, Novell NetWare, and UNIX file serving)

requires the learning of new world views.

This is nothing new. In the early days of the telephone network, competing phone networks didn't speak to each other and it wasn't uncommon to have several phones on your desk. When you wanted to make a call, you first had to check which network the other party was on and then use the appropriate phone to make the call.

Fortunately, file-server integration is further along than that. Apple has created developer tools that enable Mac users to log on to various platforms in the same way they log on to AppleShare: through the Chooser. File servers still aren't easy to integrate, but once everything's been set up, the Mac user has a single interface, with all platforms mounting on the desktop in the same manner. We've installed many multiplatform servers in the MacUser Labs NetWorkShop (see Figure 2).

Unfortunately, this standard user interface doesn't yet apply to accessing computers in other ways, such as through point-to-point file transfer, E-mail, and direct access of data from within Mac applications. To simplify and standardize computer access, Apple is enhancing the System software with connection tools such as the Communications Toolbox (see "Communications Toolbox," September '90, page 295). These tools save developers from having to devise an interface for new connectivity software. System 7.0 (and beyond) will have more (and more) of these tools.

Common File Formats. The '90s will see the continued growth of another type of connectivity, that among files from different programs. This kind of connectivity lets you open an Excel file with Full Impact or transfer a Microsoft Word file created on the PC to a Mac, thanks to file formats that have become de facto standards, recognized by different applications on different platforms.

De facto file standards will continue to multiply as vendors jump onto the compatibility bandwagon. As a result, software will become more specialized. Not only will you be able to use the best machine for the job but you'll also use the best software for each *part* of the job. For instance, you may use a vertical PC program to generate data for a specific project, import the data to a 2-D Mac visualizing program for a sketch, move it to a Silicon Graphics Personal Iris program specializing in 3-D, port it to a low-resolution Mac animation program, render the frames on a high-speed Sun workstation, and return the finished product to a Mac for presentation. Sure, there might be a single program that does everything, but not as splendidly, quickly, or inexpensively as each of the specialist programs and platforms.

Working in Sync

Just as Macs are becoming part of a growing GlobalNet of Macs and non-Macs, each individual Mac consists of a thriving microcosmic network of System software, applications, and locally resident data. Getting each separate application inside the computer to communicate so that all the programs directly and automatically share information is a task as challenging as getting all the boxes to talk to one another. In a sense, these two tasks are flip sides of one coin.

Multiplatform Distributed Processing. Using a network as a single machine — that is, automatically farming out tasks to different computers — will become possible through new technologies such as IAC (interapplication communication) and RPC (remote procedure calls). IAC, one of the new features that will be introduced with System 7.0, lets applications connect and communicate locally or across networks. For instance, in the preceding scenario of using different programs for a single task, everything could happen automatically over a network that used IAC to link the applications. Once programs become IAC-compliant, you'll be able to link any programs you like or create your own combinations, regardless of vendor. Developers are also excited about a part of System 7.0 called AppleEvents, a class of commands unique to the Mac that enable applications to control other applications.

AppleEvents, in part, is similar to RPC, a mechanism used by several non-Mac computer systems, in which other computer systems' remote procedure calls allow one computer to control applications or subroutines on other machines across a network. RPCs can be used to fetch information from databases or to offload heavy processing tasks to a more powerful host computer.

Of particular interest will be the combination of AppleEvents with RPC techniques, such as those available in Digital's VMS operating system for VAX computers. Unfortunately, AppleEvents and RPC are not yet compatible. As with file formats, vendors will ultimately need to solve these incompatibilities so that any software or hardware on the net will be available to anyone. Users then won't have to learn how to use a VAX or a PC — or the software running on them. The software on the Mac will search the network, find the computers and software applications that specialize in certain tasks, and tell those computers to run the tasks and report the results back to the user. Users won't need to be aware of what software is being used or where the processing is taking place.

The toughest part will be making it all happen behind the scenes. Not only must the pieces all fit together but users should also be able to navigate through a complex system they've never seen before. Just as anyone with a little driving experience can hop into a rental-car model they've never driven before and set off without even thinking, our goal for the Mac network of 1999 is nothing short of an intuitive, transparent, seamless, high-speed GlobalNet you can hop into without thinking about it.

Sounds like more flying cars? Don't blink; the core technologies are coming soon to a network near you.

John Rizzo and Jon Zilber are both old enough to remember the 1964 New York World's Fair, the Me decade, wicked-fast 300-bps modems, and System 4.2.

1ms Access Time



MachOne

The MachOne Drive provides up to 600MB of storage with a 1ms access time and transfer rates up to 5MB/sec. All of this at prices which are reasonable, because the MachOne increases productivity, saving time and money. If you are a programmer, and your compile times are cut by 30%, your productivity is increased significantly. You can save more money by sharing the drive with several programmers. If you do graphics and layout and get paid by the piece, the speed of a MachOne can increase your productivity and profitability by a factor of ten. You get more value out of your other equipment too, because it's no longer held hostage by a slow drive.

DOSFloppy

The new DOSFloppy from PLI is a SCSI floppy drive which offers both 360k and 1.2MB disk formats with a single Macintosh drive. Other manufacturers require you to buy two separate drives to fulfill those needs. DOSFloppy is fully daisy-chainable and features external SCSI address and termination switching. AccessPC from Insignia Solutions is bundled, free, with the drive. AccessPC is a CDEV/INITwhich causes MS/DOS diskettes to mount on the Desktop, just as if they were Macintosh disks. The files can be opened by double-clicking or copied by dragging in the Finder.

SuperFloppy

The SuperFloppy and TurboFloppy 1.4 are SCSI floppy drives for the Mac, which provide 1.44MB Mac and DOS and 720k DOS diskette compatibility. The SuperFloppy offers the added benefits of 400k and 800k Macintosh compatibility. Both drives are fully compatible with AccessPC and SoftPC from Insignia Solutions. They are also compatible with all of the popular file translation software. This means that, under DOS emulation on your Mac, the floppies will act like DOS drives, and in the Mac's Finder, DOS floppies mount on the Desktop. The drives feature external SCSI ID and termination switches, and auto-eject.



PLI MachOne

Infinity 40 Turbo

The Infinity 40 Turbo uses removable 44 MB cartridges for convenience and virtually limitless storage potential. It is also extremely fast, with a 20ms access time. The Infinity 40 works on all SCSI Macs and IBM PC AT, XT, PS/2 and compatible computers. MS/DOS files may be accessed on the Mac with our DOSTransfer utility. Bundled free with each (non economy) Infinity 40 for the Mac is Casady and Greene's A.M.E. , the most complete software security package available for the Mac and a $279 value.

Optical Drive

Rewritable magneto-optical drives are becoming more and more accepted as storage solutions for the typical user. The drives offer high-capacity, low cost per megabyte and data integrity far superior to that of conventional magnetic media. They are also surprisingly fast. PLI offers three attractive optical solutions. The familiar single drive Infinity Optical (600MB), the Jukebox Jr. (6.5 Gigabytes) and the Infinity Optical Jukebox (36 Gigabytes). We will work with you to provide the solution you need.

CD ROM Drive

The PL CD-ROM is based on a new, 380ms Sony mechanism. It features a self-cleaning objective lens, audio output through a 1/8" headphone jack and two RCA jacks, full volume control, and external termination and SCSI ID switches. The software supports HyperCard audio XCMDs and multiple volume CD-ROM discs. Also included is a DA, Music Box, which allows the playing and full control of audio CDs in the background.

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THOROUGHLY MODERN MODEMS

The box may say 2,400 bps, but don't be fooled — these communication speedsters can easily blast well past that barrier.

BY STEPHEN SATCHELL AND THE MACUSER LABS STAFF

Modems are like cars — only smaller. Both have a single purpose: transportation from point A to point B. And both trade price for performance. Sure, you can pick up an old 300-bps modem or a used Yugo for next to nothing, but both will provide predictably pathetic performance. A 38,400-bps supermodem or a Porsche 959 can blast your data or you as fast as sanity will allow, but do you really need all that power? And can you even think of paying for it?

In between the Yugo and the Porsche nestle the family sedan and the 2,400-bps modem — fast enough for daily use without the sticker shock. And both can benefit from factory performance options. A 2,400-bps modem, for example, can now be turbocharged with data-compression and error-correction schemes that boost performance to three to four times its current level.

PHOTOGRAPHY: FRED STIMSON



Error-correcting and data-compressing modems are not only more expensive than standard 2,400-bps modems but they're also harder to set up and use. They require hard-to-find hardware-handshaking Mac-to-modem cables and telecommunication software that supports data compression and error correction. When you're selecting souped-up 2,400-bps modems, we recommend that you stick to a Mac-specific modem *package* that comes complete with the correct cable and software — that's how we chose the modems we evaluated for this report.

Although there are dozens of modem companies, we found only eight error-correcting and data-compressing 2,400-bps modems that ship with complete packages for the Mac: the Anchor Automation 24E5 MacPac, Applied Engineering DataLink Express, Computer Friends Lightspeed 2400LE, Hayes V-series Smartmodem 2400, Intel 2400EX MNP-Macintosh, Mirror Technologies DM2405, Prometheus ProModem 2400M Plus, and Zoom Telephonics Zoom/Modem V.42bis. Prices range from a low of $159 for the Computer Friends Lightspeed to a high of $699 for the Hayes V-series Smartmodem 2400. These packaged modems may cost a little more than stand-alone ones, but their bundled parts make them convenient bargains when compared with stand-alone modems that won't work correctly with your Mac.

Standard Modem Standards

The heart of any modem is its *data pump*, which determines much of its performance. The data pump is the chip — or set of chips — that handles the conversion of the Mac's digital signals into analog signals that the modem sends as audible tones over the phone line. This is called *modulation* — the *mo* in *modem*. On the receiving end, the data pump converts the analog signals back into digital ones, a process called *demodulation* — the *dem* in *modem*. Four of the modems we reviewed use data-pump chips from Intel; the rest use chips from Rockwell, Exar, and Sierra (see Table 1).

One telling aspect of a modem's performance is how well it handles error correction and data compression. Low-speed modems — 300 bps, 1,200 bps, and standard 2,400 bps — include neither error-correction nor data-compression capabilities. Without error correction, they are prey to the myriad disturbances that



can afflict telephone lines (see the "How It Works" sidebar) — a poor phone connection can garble their transmissions. Without data compression, low-speed modems are limited to their rated speeds. Compression enables a modem to shrink files at one end, transfer them in their shrunken form, and then unshrink them at the other end, resulting in an "effective speed" much higher than its rated speed. Thus a 2,400-bps modem with both error-correction and data-compression abilities can transmit error-free at effective speeds of up to 9,600 bps — four times its rated speed.

It's easy to evaluate error correction — it either works or it doesn't. The Hayes V-series Smartmodem

On the Horizon

In a fast-moving field such as fast-moving modems, products are often released after we've completed our tests. A new MultiTech modem, for example, has joined the Hayes Smartmodem and the Zoom/Modem V.42bis in the V.42bis ranks. The MultiTech MT224EM7B — now *there's* a catchy name — lists for $549 and comes bundled with the correct cable and QuickLink II software. MultiTech, 1372 Valencia Avenue, Tustin, CA 92680; (714) 259-9555.

The software for the Global Village TelePort 2,400-bps modem — with error correction and data compression — wasn't quite ready when we did our extensive testing but made it under the wire for a last-minute review (see Reviews in this issue). The TelePort is special in that instead of connecting to the Mac's serial port, it plugs into the ADB (Apple Desktop Bus) port, where you connect your keyboard and mouse, thus freeing up a serial port. Although incompatible with non-ADB Macs such as the Plus, the TelePort is the ideal solution for people who already use their serial port for other devices, such as a digitizing tablet. Global Village, 1204 O'Brien Drive, Menlo Park, CA 94025; (415) 329-0700.

A growing number of vendors are offering combined fax and data capability. Some manufacturers are also offering low-cost fax upgrades for their data-only modems. Applied Engineering already offers one for its DataLink Express. Surprisingly, the added functionality doesn't double the price of the modem, as you might expect. The data-only DataLink Express sells for $299; the data and fax version sells for only $50 more.

For those of you who want the ultimate in speedy data and fax, Prometheus has the first 9,600-bps send/receive fax in a V.32 9,600-bps modem — most modems fax at 4,800 bps, tops. The ProModem 9600M Plus ($995) also has V.42 and MNP 5 for error correction and data compression. Prometheus Products, Inc., 7225 S.W. Bonita Road, Tigard, OR 97223; (503) 624-0571.

And — even though it's not a modem — we couldn't pass up the opportunity to tell you about another new telecommunications product, the Ricoh DX-1 *fax server* (hardware, $799; software, $275). This box connects your Mac to your fax machine and turns your otherwise lazy fax machine into a scanner, OCR machine, and even a printer. Ricoh Corp., 5 Dedrick Place, West Caldwell, NJ 07006; (201) 882-2000.



The winners (from left to right): The Zoom Telephonics Zoom/Modem V.42bis and the Hayes V-series Smartmodem 2400 are the two clear high-speed standouts. The Computer Friends Lightspeed 2400LE is an excellent buy, and the Prometheus ProModem 2400M Plus is bundled with convenient and powerful software.

2400 and the Zoom/Modem V.42bis use an international error-correction protocol called CCITT V.42. The other six modems use Level 4 of the MNP (Microcom Networking Protocol) error-correction scheme (more on both of these later). Both error-correction protocols ensure that noise on phone lines doesn't garble data while moving it transparently to the user. In fact, modems that have either in-modem error-correction scheme disconnect before sending error-laden data. (The V.42 protocol incorporates MNP 4, so the two modem types are compatible.)

Data-compression performance varies from modem to modem. The Hayes V-series Smartmodem 2400 and the Zoom/Modem V.42bis offer both V.42bis and MNP 5 data-compression schemes. The rest of the modems offer only MNP 5. Our testing showed V.42bis modems to be almost twice as fast as those that follow the MNP 5 protocol — but you need a V.42bis modem on both ends to take advantage of the faster speeds. The V-series Smartmodem 2400 and Zoom/Modem V.42bis lose their speed advantage when they're talking with MNP 5 modems, because they automatically shift down to MNP 5 speed. All the modems we tested can also downshift to match the speed of an unenhanced 2,400-bps modem, a 1,200-bps modem, or even an archaic 300-bps sluggard.

If you're starting to get confused about what the V.42, MNP 4, V.42bis, and MNP 5 numbers mean, just be happy that you're not a modem manufacturer. These numbers and acronyms are just a few of the many names for modem-communication standards. First, there are standards governing how modems talk to each other. For example, the V.22bis standard, defined by the Geneva-based CCITT (the French acronym for the International Consultative Committee for Telephone and Telegraph), defines how all 2,400-bps modems communicate — whether they use error correction, data compression, or no enhancements at all (see "Modems: 9,600 bps and Counting," January '90, page 180).

Microcom developed its error-correction and data-compression protocols back in 1983 and licensed the technology to other modem companies. MNP Levels 4 and 5 define these schemes for error correction and data compression, respectively. It wasn't until 1989 that the CCITT defined its specifications for the new modem technology; by then the MNP standards were so popular that they had become de facto industry standards — which is why the CCITT made the V.42 specification compatible with MNP 4. Only two out of the six modems we reviewed use the CCITT specifications. The balance should shift as the advantages of V.42bis become apparent.

Package Parts

When we unpacked the modems, the Mac-to-modem cable was the first thing we examined. If the companies didn't get this essential — and deceptively simple — part right, the rest of the package was doomed from the start.

To take full advantage of either MNP 5 or V.42bis data compression — that is, to achieve speeds greater than 2,400 bps — a Mac must send data at a higher speed, usually 9,600 bps. This ensures that the modem gets enough data to keep the modem-to-modem transfer going as fast as it can. (You set the speed through software.) But there are times when the modem can't transfer at 9,600 bps — the file may not be compressible, or the telephone line may be so noisy that the modem has to resend the data. The Mac, however, still sends data at 9,600 bps through the serial port, so the modem has to have a way of telling the Mac to stop. This process is called *flow control*.

New modems achieve flow control through hardware — and the all-important hardware-handshaking cable. A modem sends current through a particular pin in the cable to tell the Mac when it can take data and turns the signal off when it can't take data. The Mac serial port has an 8-pin connection, whereas most modems have 25-pin connections — the Applied Engineering DataLink Express is the only modem with an 8-pin connection. Normal Mac-to-modem cables, such as the one Apple supplies, aren't wired to the pin required for correct flow control. The Macintosh serial port supports hardware flow control, but you require a

How It Works: An Encyclopedia of Phone-Line Defects

1. **Amplitude jitter and amplitude hit**
 Symptom: The other party's voice level keeps changing.
 Cause: The phone company is performing a "hot patching" test to get around telephone-equipment problems, or someone is picking up an extension.
 Modem: Modems are sensitive to sharp changes, whereas gradual changes have little effect.
2. **Attenuation distortion and envelope delay**
 Symptom: The voice on the other end of the line sounds flat, as if the bass and treble levels have been turned to their lowest possible settings.
 Cause: Parts of a signal's frequency become distributed while traveling along the wire.
 Modem: A modem compensates by reintegrating the parts.
3. **Compression**
 Symptom: You can't hear this one. The signal as a whole doesn't change, but its phase — the position of each bit-carrying-signal change relative to the previous change — is lost.
 Cause: On digital circuits — such as France's fiber-optic network — the digital equivalent of your voice is compressed in order to make room for more connections. This can destroy the phase of the signal.
 Modem: Because modems use phase changes to communicate at speeds faster than 1,200 bps, compression may limit modem speeds.
4. **Cross talk**
 Symptom: When signals "bleed" into each other, you start to hear voices from another line.
 Cause: There are many sources, but the most likely culprit is two wires that are too close to each other.
 Modem: This becomes a problem when the bleeding signal is coming from another modem connection.
5. **Impulse noise**
 Symptom: You may hear a loud pop that is caused by the telephone-network switching system.
 Cause: Telephone networks switch connections to and from different lines. Mechanical switching can sometimes cause a pop in the line. Lightning can also introduce this noise. Electronic switching can minimize it.
 Modem: A loud pop can cause a modem to send errors or, if it has in-modem error correction, to slow down.
6. **Insertion loss**
 Symptom: The signal is less than full strength when going from one end to the other, so you have trouble hearing the other person's voice. There can be different amounts of loss in each direction, so you may hear the other party when the other person can't hear you, or vice versa.
 Cause: Long telephone wires can cause loss of signal strength.
 Modems: Modems can work with weak signals, even when you may have a hard time hearing a speaker.

The next time you have a phone conversation, listen carefully and you'll hear a lot of other sounds besides the caller's voice. A modem is sensitive to these noises — as well as to other noises inaudible to the human ear. These noises are called *line impairments*, and modem designers have to protect against them.

Like everything else in the telecommunications industry, line impairments are defined by standards. Line-impairment standards are put forth by the EIA (Electronic Industries Association) and the TIA (Telecommunications Industries Association). We set our test equipment to the EIA/TIA-496-A standards that define conditions common to local, transcontinental, and satellite-hop connections.

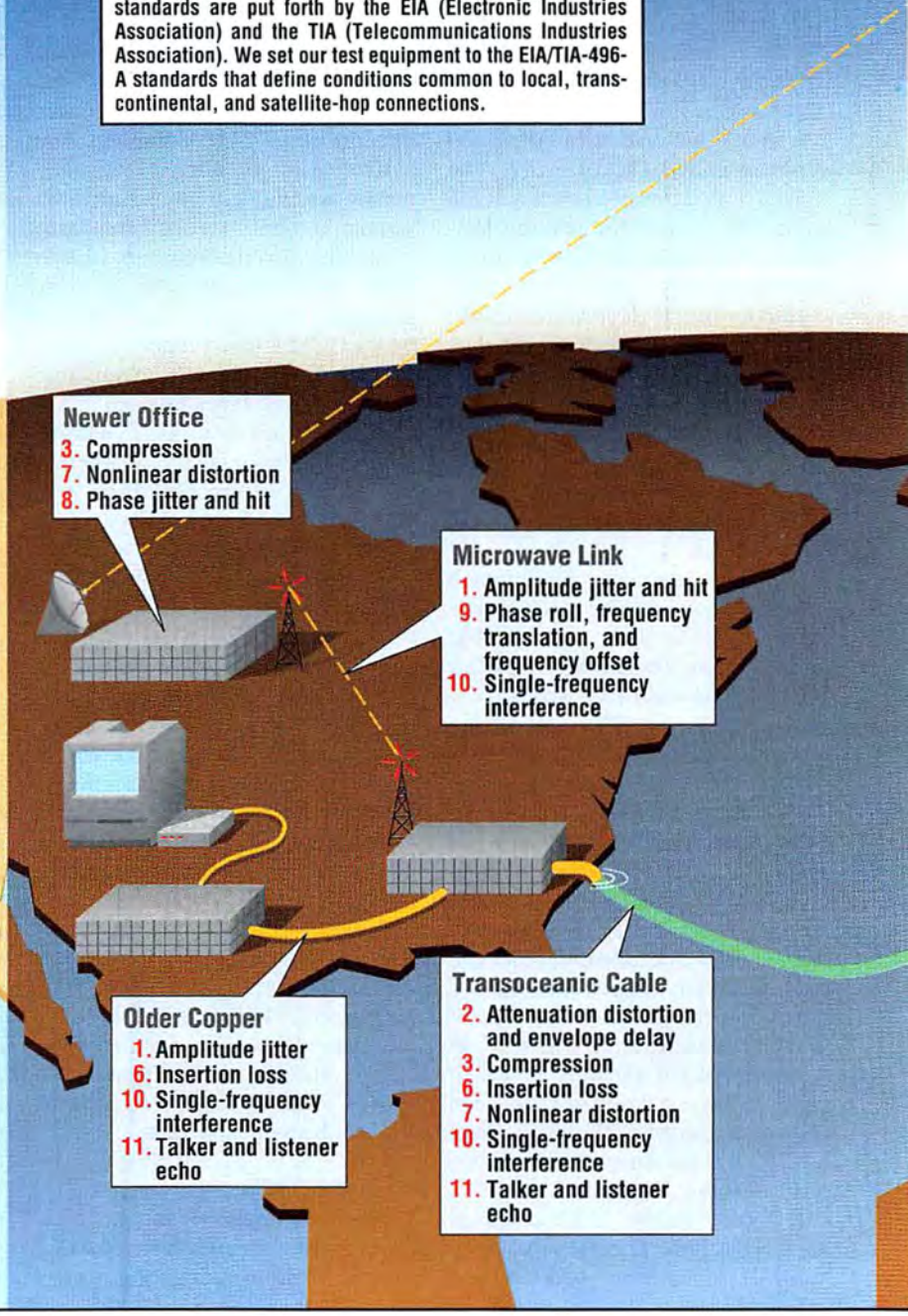
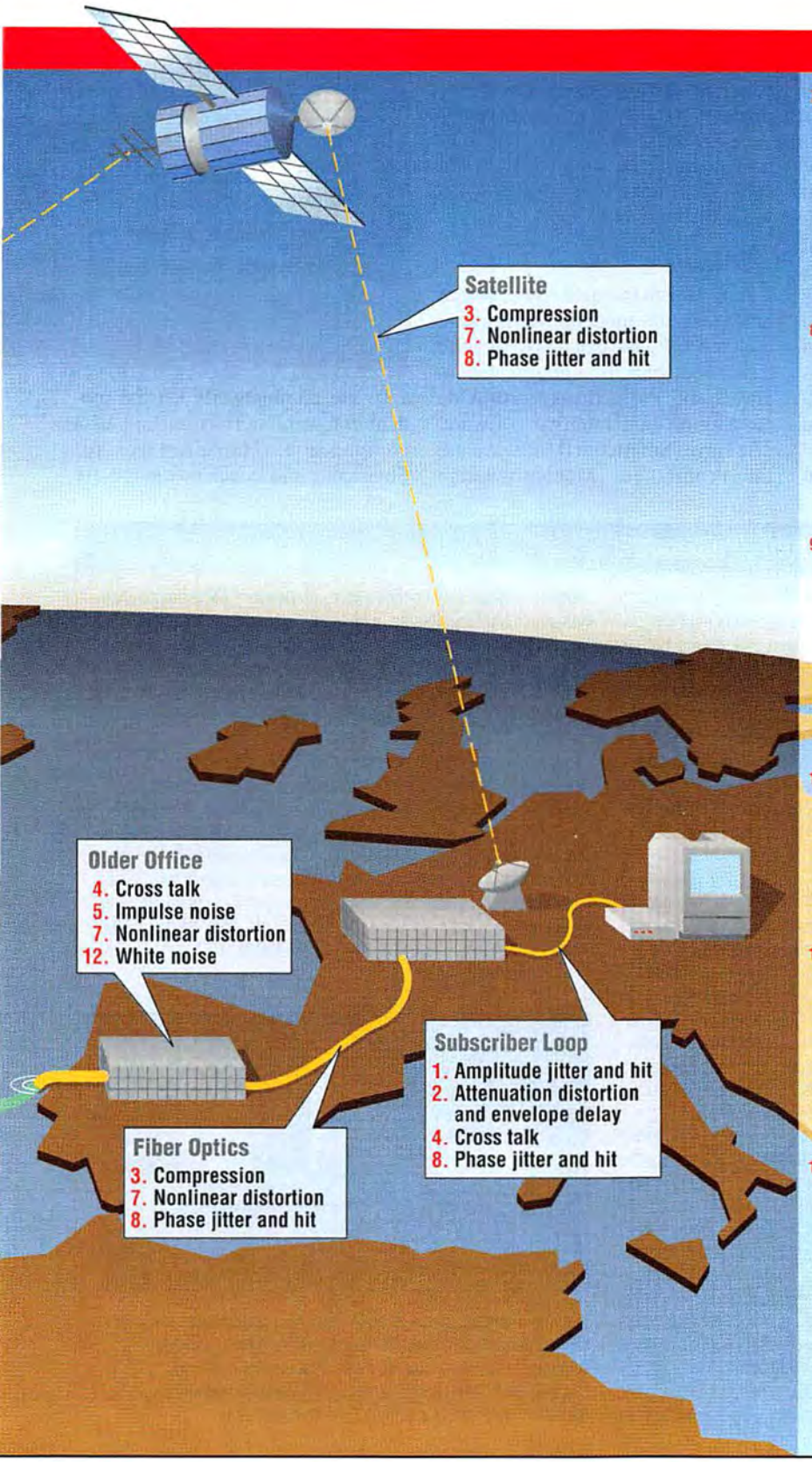


ILLUSTRATION: K. DANIEL CLARK



7. **Nonlinear distortion**
Symptom: When the voice on the other end sounds scratchy, you probably have too much distortion.
Cause: Noisy amplifiers, digital-to-analog converters, and systems that use radios to carry the signal can introduce distortion.
Modem: Modems achieve their high speeds by changing the signal in subtle ways. Distortion can interfere with the signal so that the receiving modem can no longer understand it.

8. **Phase jitter and phase hit**
Symptom: The pitch of the signal changes and sounds like a vibrato.
Cause: The most common source is interference from the voltage another phone uses to ring its bell.
Modem: Modems themselves alter the pitch of the signal to transmit information. If the pitch of the carrier signal is erratic, the receiving modem won't understand the information being sent.

9. **Phase roll, frequency translation, and frequency offset**
Symptom: The pitch of the entire signal changes, but you probably won't notice it unless you have a musician's ear for perfect pitch.
Cause: Radio-frequency-based systems can lower or raise a signal's pitch.
Modem: A modem is able to adjust to a steady change in pitch more accurately than to a constantly changing pitch such as phase jitter.

10. **Single-frequency interference**
Symptom: This sounds like a howl or a whistle and can get very loud.
Cause: Older trunk circuits — wires between telephone-company central offices — are prone to malfunctioning and generating this noise.
Modem: Most modems can filter out this noise, so they are not affected by it.

11. **Talker and listener echo**
Symptom: This is the echo you hear of your own voice or the voice on the other end of the line.
Cause: Signals can be reflected back to the sender, and the delay introduced by the extra travel distance causes the echoes.
Modem: Although all modems can be affected by echoes, high-speed V.32 9,600-bps modems are most affected and so have special chips to counter them.

12. **White noise**
Symptom: If you have an older FM receiver, you may hear what sounds like a waterfall when you're between stations. This is white noise.
Cause: White noise, generated by the movement of molecules, is inherent in all electronic circuits. Analog equipment — such as telephone circuitry — generates much more white noise than digital equipment does.
Modem: Modem tolerance varies with the speed of the data transfer — the higher the speed, the less tolerant the modem.

hardware-handshaking cable that is wired to the flow-control pin (see "Modem-Cable Rewiring," January '90, page 213).

Five companies — Anchor Automation, Applied Engineering, Mirror Technologies, Prometheus, and Zoom Telephonics — include hardware-handshaking cables. We'd count Hayes as number 6, but although its cable did support flow control, a faulty ROM in the modem wreaked havoc on our Mac serial ports and caused the Mac to ignore flow control. Hayes now recognizes the problem and will upgrade the defective ROMs without charge.

Computer Friends and Intel sent cables that didn't implement flow control at all. What made things worse was that instructions sent with the modems assumed that the right cables were being used. Both companies now claim to be shipping the right cable, but make doubly sure when you call about an order.

Software

Armed with the right cable, you're ready to use the modem. This is where bundled software can help make life easier, but only two companies — Hayes and Prometheus — provide easy-to-use and intuitive software. The Hayes Smartcom II software and the Prometheus MacKnowledge



software automatically set the modem for error correction and data compression. The interfaces for Smartcom and MacKnowledge are

Solutions to Modem-Related Problems

You go to the kitchen for a cup of java while waiting for the last 5 minutes of a 20-minute download. But in the middle of pouring your steaming cup, you notice your visiting cousin pick up the kitchen phone and start dialing. You run, mouth agape, to your Mac, which now has a "no carrier" message instead of "download finished" on the screen. All you can do is curse and redial.

There are solutions to this and other modem-related problems. To protect against unknowing cousins, DesignTech has the Interruption Blocker. This $14.95 device sits between the phone jack and the phone you want to block. If a modem or another phone is off the hook, the blocked phone is disabled. DesignTech International, 7401 Fullerton Road, Building 1, Springfield, VA 22153; (703) 866-2000.

Nature can also wreak havoc with a modem. For example, if lightning strikes a nearby telephone pole, your modem may instantly become an expensive paperweight. Panamax offers several protective devices for just such an unexpected occurrence. You can buy a device just for the phone line (Datamax, $49) or a combination AC-power and phone-line surge suppressor, available as a single-outlet Faxmax ($89), a dual-outlet Telemax 2 ($99), or a four-outlet Telemax 4 ($129). Panamax backs its products with an impressive guarantee: If any device is damaged by a transient surge that passes through its protector, Panamax will pay the repair bill. Panamax, 150 Mitchell Blvd., San Rafael, CA 94903; (800) 472-5555.

For those of you who travel and want to use a modem, Farallon Computing has two nifty products. For $49.95, you can buy the WakeUp cable, a hardware-flow-control modem cable that also connects to an ADB port so it can power up your Mac when you dial up the Mac's modem. Farallon also markets the Portable Pack, geared for Mac Portable users on the road. You get a virtual survival kit for remote computing, including wire cutters, phone cable, every imaginable phone connector, alligator clips, and even a Swiss army knife. The price of the Portable Pack is $495 and includes Farallon's Timbuktu and Timbuktu/Remote, programs that let you control a Mac from another Mac. Farallon Computing, 2000 Powell Street, Suite 600, Emeryville, CA 94608; (415) 596-9000.

If you're on a PBX and don't have another phone line for your modem, you can add a phone jack through your PBX with Traveling Software's Mo Fone. Besides having the hippest name since the '70s, this little device works with many common PBX devices and key-switch phones, including AT&T's Merlin system. It even comes with alligator connectors that hook onto the inside of the handset. The Mo Fone sells for $99. Traveling Software, 18702 North Creek Parkway, Bothell, WA 98011; (800) 662-2652.

For the busy office with a single telephone line, La Cie has a $249 device called the Phone Line Manager Plus that allows you to share the phone line with a fax machine, phone, modem, and answering machine. The Phone Line Manager Plus gives you or your answering machine five rings during which to answer a telephone call; otherwise the call goes to the modem. If the device detects a fax tone, the call is routed to the fax machine. You can also route calls manually with a touch-tone phone. La Cie Ltd., 16825 S.W. 85th Street, #306, Tigard, OR 97224; (800) 999-0143 or (503) 691-0771.

— Andrew Eisner



These five products can each in their own special way relieve telecommunication tension (clockwise from top): Farallon's WakeUp cable and Portable Pack, Panamax's Datamax, DesignTech's Interruption Blocker, Traveling Software's Mo Fone, and La Cie's Phone Line Manager Plus.



These four modems improve throughput to better than 2,400 bps, but their price and performance couldn't match those of our four winners (from left to right): Anchor Automation 24E5 MacPac, Applied Engineering DataLink Express, Intel 2400EX MNP-Macintosh, and Mirror Technologies DM2405.

Mac-like, with icons to drive the programs.

The other six modems bundle simple terminal-emulation programs. Three — the Anchor Automation 24E5 MacPac, Computer Friends Lightspeed, and Intel 2400EX — come with QuickLink II software. Applied Engineering bundles Terminal 1.5, a public-domain program, with its DataLink Express modem. The Zoom/Modem V.42bis comes with Zterm. Mirror Technologies offers the best terminal program of the lot, bundling MicroPhone 1.5. The real deal of this bundle is that you can then upgrade to MicroPhone II 3.0, which lists for $295, for only $75. The Mirror DM2405 modem lists for $197. It's like getting a free — and reasonably powerful — modem for the cost of a copy of MicroPhone. We used MicroPhone II for our own testing.

Besides being far from intuitive, the terminal-emulation programs don't help you set up the modem for full data compression or error correction — you have to manually send the appropriate commands to the modem. To do this, you have to know what the commands are, which means (shudder) turning to the manuals.

Unfortunately, the manuals are pretty generic. When you read a manual and the only computer it mentions is a PC, you know you're not going to get much out of it. Only the manual from Zoom Telephonics gives you clear instructions about what commands to type into your program and download to your modem. With the rest of the modems, the instructions tend to be hit or miss. The next step is to call the company's technical support.

The two modems that gave us the least trouble to set up came from the two companies — Hayes and Prometheus — with the best tech support. With the other companies, the only thing going for you is luck, as in "good luck." If the person on the line doesn't know the difference between CCITT and a BLT, try your dealer or local user group for more help.

After setting up the modems as directed by the manuals or the manufacturer's tech-support folks, we used the software bundled with each modem to dial two on-line services — just to make sure that each modem/software/cable package worked. We dialed up Zmac — *MacUser*'s on-line service — on CompuServe and *BYTE* magazine's on-line service — BIX — through Tymnet. We dialed in to 2,400-bps V.42 error-corrected connections — at press time, the two services had yet to offer V.42bis or MNP 5 data-compression connections. All the modems but Applied Engineering's DataLink Express connected without a hitch. The DataLink Express repeatedly lost the MNP 4 connection with Tymnet and dropped to a normal 2,400-bps connection without error correction. Therefore, we don't recommend the DataLink Express for use with these on-line services.

The 2,400-bps Barrier

You set up a modem once, but you transfer data many, many times, so speed is ultimately the most important criterion in selecting a modem. We sent three types of files between a pair of modems from each manufacturer (see Figure 1). We designed our tests to reflect the fact that compression works by recognizing patterns — particularly repeating patterns — and then coding the data into smaller bits. We therefore chose three types of files with three types of internal patterns to see how successfully each would be coded — and thus shrunk — by the modems' compression algorithms.

We sent the test files over three industry-standard test lines: a noisy local connection, a noisy land-based coast-to-coast connection, and a fairly clean connection with a single echo-inducing satellite hop in each direction. We used a telephone-network simulator from PTT (Processing Telecom Technologies) to simulate the different line conditions. Testing by making calls over real telephone lines is uncertain at best, but with the PTT equipment, we were able to simulate the three line conditions consistently and accurately.

All the modems consistently broke the 2,400-bps barrier when transferring each of the three files. They also endured the different types of noise experienced on each of the three lines without shutting down. Above and beyond these basics, two modems — the Hayes V-series Smartmodem

Figure 1: File-Transfer Speed

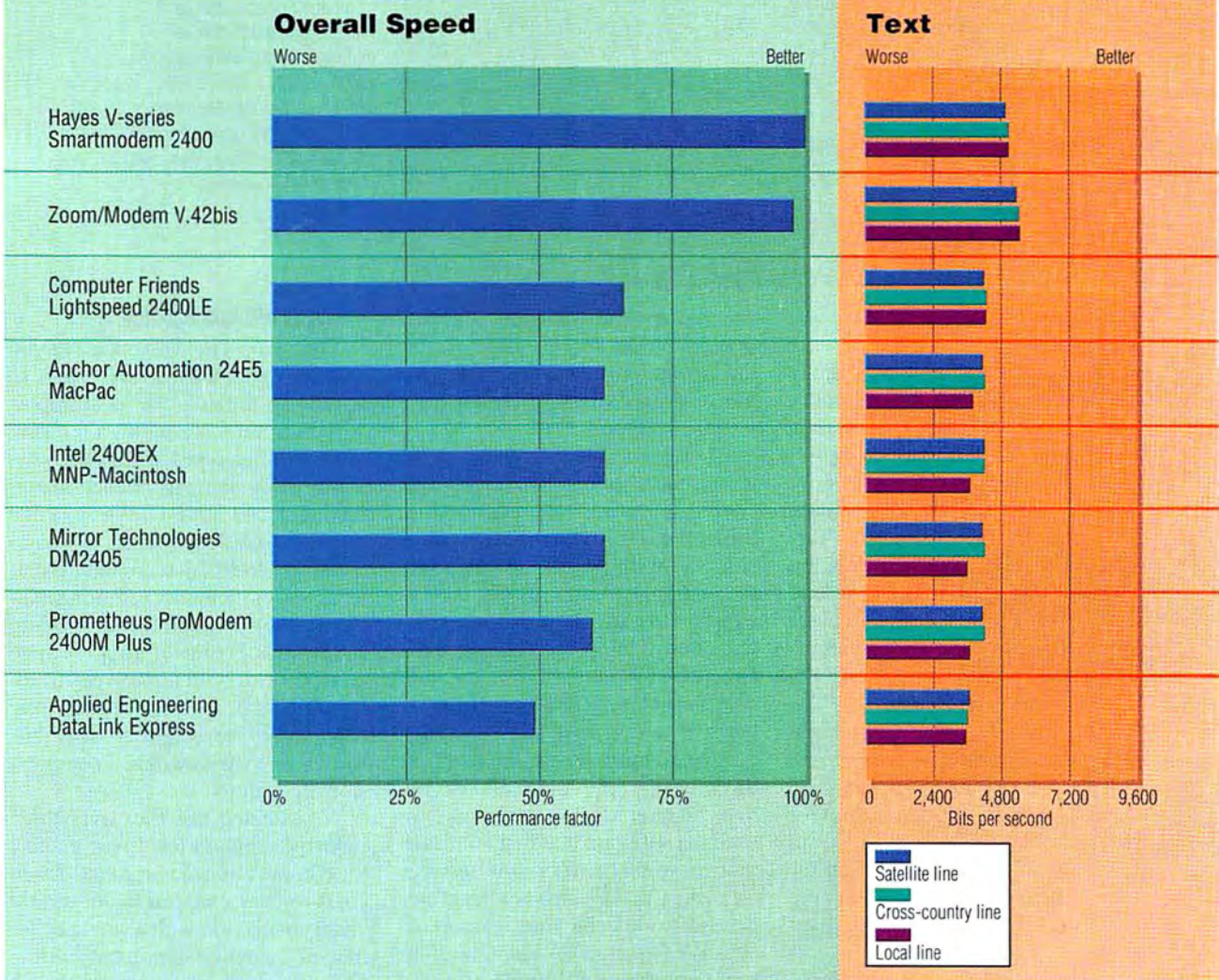
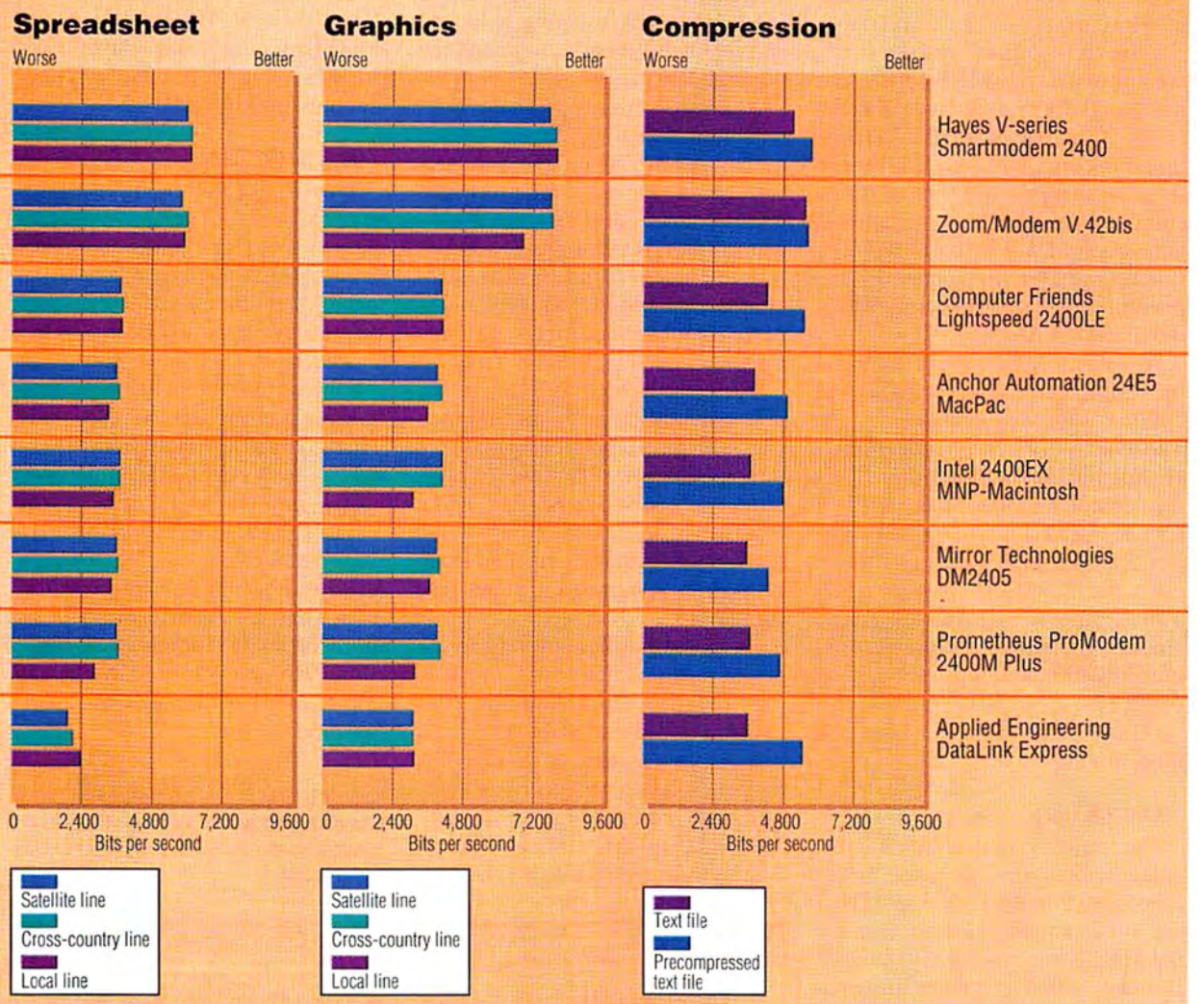


Figure 1: Each of these modems includes foolproof error correction — it's file-transfer speed that separates the winners from the also-rans. To test file-transfer speed, we transferred three types of files — a text file, a spreadsheet file, and a TIFF file — between two modems from each manufacturer. We also tested file-transfer speed with the text file compressed with StuffIt. We used sophisticated test equipment from Processing Telecom Technologies to simulate *line impairments* (noise and other disturbances) found on three types of telephone lines: a local line, a cross-country line, and a satellite line.

Overall Speed:
To discover the overall winner, we averaged each modem's performance on all the tests and then compared each modem with the winning Hayes V-series Smartmodem 2400. Both the Smartmodem and the Zoom Telephonics Zoom/Modem V.42bis use the V.42bis compression protocol. V.42bis proved far more efficient than the MNP Level 5 scheme the other modems use.

Text:
Although the two V.42bis modems remained the winners, the MNP 5 modems made their best showing in this test. All the modems were able to transfer the uncompressed text file at speeds well beyond 2,400 bps. In most cases, the type of telephone line made little difference in transfer speed.



Spreadsheet:
Again, the two V.42bis modems showed their superiority on all types of lines — the Hayes V-series Smartmodem 2400 was a full three times as fast as the Applied Engineering DataLink Express. The DataLink Express actually dropped well below 2,400 bps.

Graphics:
The Hayes V-series Smartmodem 2400 consistently surpassed 8,000 bps when transferring the TIFF file, with the Zoom Telephonics Zoom/Modem V.42bis following close behind. The MNP 5 modems averaged half the V.42bis modems' speed on all line types.

Compression:
To compare the efficiency of each modem's compression scheme with that of the popular compression utility StuffIt, we transferred — with each modem's compression protocol active — an uncompressed and a StuffIt-compressed text file. We then "unstuffed" the StuffIt file and calculated the effective speed of the transfer — that is, how many unstuffed bits per second had been sent in stuffed form. We found that using StuffIt in addition to in-modem compression is faster than using any of the in-modem compression schemes alone.

2400 and the Zoom/Modem V.42bis — showed outstanding performance. Unlike the other six, both winning modems use V.42bis compression. V.42bis can compress up to twice the amount of data that MNP Level 5 can handle, thereby reducing transfer times. On the local line, the V-series Smartmodem 2400 sent a TIFF file — a bit-mapped file with a lot of compressible patterns — at a remarkable speed of just below 8,200 bps. Interestingly, MNP 5 modems compressed the text file tighter than they did the TIFF file.

Among the MNP Level 5 modems, the Computer Friends Lightspeed 2400LE was consistently the fastest. The other MNP Level 5 modems fell slightly behind, but the slowest performer in all the tests was the Applied Engineering DataLink Express. The DataLink Express failed to surpass even the 2,400-bps barrier when transferring the spreadsheet file, whereas the Hayes V-series Smartmodem 2400 sped along at more than 6,000 bps. *Express* is the last word we'd use to describe the DataLink modem.

Crunch Time

Our results show that the modems' data compression can push transfer speeds to well above 2,400 bps. There are also compression programs for the Mac — such as StuffIt and Disk Doubler — that let you precompress your file before you send it by modem. Many on-line services use StuffIt to compress downloadable files to save on both storage space and transmission time, so we used this popular file compressor to compress our test text file to see how well each modem would perform when sending a precompressed file.

MNP 5 modems can't recognize when a file is already compressed, so they choke on precompressed files in two ways: First, they all spend precious time trying — and failing — to compress the precompressed file. Second, some add extraneous compression-code information and create a data stream that is actually larger than the original file. V.42bis modems are smarter — they look to see if what they're doing is indeed helpful, and if it isn't, they send the original data instead.

Not surprisingly, when sending precompressed files, the two V.42bis modems were again the top performers in our tests. The V-series Smartmodem 2400 and the Zoom/Modem V.42bis broke the 2,400-bps barrier when sending the precompressed text file, whereas all the MNP 5 modems struggled, some dipping to well below 2,400 bps.

We then decided to test whether it's more efficient to precompress files with StuffIt or let each modem's internal compression powers do the chore. We discovered that using StuffIt and in-modem compression gives much better results than using in-modem compression alone (see Figure 1).

Of course, you have to consider the added time and hassle of compressing and decompressing the files manually — the modems compress and decompress files on the fly while they are sending and receiving them. Although compressing or decompressing a StuffIt file takes only about four seconds, you must also allow for the added time and energy spent opening the program, finding the archive, and typing in the name of the file to be saved. The convenience of in-modem compression wins out over the slight advantages of precompressing files on the Mac.

Best of the Best

Souped-up 2,400-bps modems set new standards for price and performance. Data compression makes them faster, and error correction makes them more reliable than ever before — your family sedan now has a turbocharger and an air bag.

Speed is the bottom line in judging modem performance — especially when comparing Mac-specific packages — so we recommend that you buy a modem that supports the V.42bis data-compression standard (see "The Bottom Line" sidebar). A V.42bis modem can be twice as fast as an MNP 5 modem and also uses a more efficient compression algorithm. However, even MNP 5 can improve the performance of a 2,400-bps modem.

Stephen Satchell is a telecommunications expert who spends too much time commuting from his mountain home to MacUser Labs when he should be telecommuting.

The Bottom Line

A 2,400-bps modem is no longer limited to 2,400-bps performance. Data compression and error correction speed the eight modems we tested far beyond that barrier and make them more reliable in the process. These new souped-up modems require a special cable and software, so we tested only Mac-specific packages that included both. The two clear winners are the Zoom Telephonics **Zoom/Modem V.42bis** ($329), and the Hayes **V-series Smartmodem 2400** ($699). The Smartmodem 2400 is slightly faster and has better manuals and software, but the Zoom/Modem is the better buy, at less than half the price of the Hayes product. Both modems use CCITT V.42bis compression, which gives twice the speed of the competing MNP Level 5 protocol. In some tests, both modems achieved throughput close to 9,600 bps, whereas the fastest MNP Level 5 modem achieved only 4,200 bps.

The $159 Computer Friends **Lightspeed 2400LE** isn't nearly as fast as the two V.42bis modems, but its price/performance ratio rates it just behind the two winners. It's the fastest MNP Level 5 modem as well as being the least expensive modem we reviewed. Just make sure you ask Computer Friends for the right cable, the CBL-124, which successfully handles hardware flow control, necessary to take advantage of the faster speeds and reliable transfers. If you're looking for a hassle-free package and don't mind paying a little for it, the Prometheus **ProModem 2400M** at $299 is the next-best bet. Installation is more than quick and easy — it's automatic.

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-BMUG Newsletter, Vol. VI, No. I

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Table 1: Features of 2,400-bps Modems

				
	Anchor Automation 24E5 MacPac ★★★	**Applied Engineering DataLink Express** ★★½	**Computer Friends Lightspeed 2400LE** ★★★½	**Hayes V-series Smartmodem 2400** ★★★★½
List price	$349	$299 ($349 with fax)	$159	$699
Comments	Average performance. Limited software. Good warranty.	Slow, limited software. May have trouble with with some on-line services.	Lowest price. Fastest MNP 5 modem. Best buy.	Fastest modem. Expensive. Easy-to-use software and manuals.
Speeds (bps)	300, 1,200, 2,400	300, 1,200, 2,400	300, 1,200, 2,400	300, 1,200, 2,400
Standards supported	Bell 103, 212A CCITT V.21, V.22, V.22bis	Bell 103, 212A CCITT V.21, V.22, V.22bis	Bell 103, 212A CCITT V.22, V.22bis	Bell 103, 212A CCITT V.21, V.22, V.22bis
Error correction	MNP 4	MNP 4	MNP 4	V.42* Hayes LAP-B
Data compression	MNP 5	MNP 5	MNP 5	V.42bis, MNP 5, Hayes ADC
Features				
Synchronous communication	○	●	●	●
Password, callback	○	○	○	○
Encryption	○	○	○	○
Remote configuration	●	○	○	○
Self-tests	●	●	●	●
Fax option	○	●	○	○
Accessories				
Hardware-flow-control cable	●	●	●	●
Bundled software	QuickLink II 1.1.3	Terminal 1.5	QuickLink II 1.1.3	Smartcom II Mac, HayesConnect
Controls				
Front-panel controls	none	none	none	none
Rear-panel controls	power	power	power and volume	power
Status lights	8	11	8	8
Data-pump supplier	Intel	Sierra	Exar	Sierra
Size (W x D x H, in.)	6 x 9 x 1.5	5.7 x 8.4 x 1.6	10 x 5.4 x 1.4	5.5 x 9.6 x 1.75
Warranty	5 years	5 years	1 year	2 years (plus 2 years for $75)
	Anchor Automation, Inc. 20675 Bahama St. Chatsworth, CA 91311 (818) 998-6100	Applied Engineering 3210 Beltline Rd. Dallas, TX 75234 (214) 241-6060	Computer Friends, Inc. 14250 N.W. Science Park Dr. Portland, OR 97229 (800) 547-3303 (503) 626-2291	Hayes Microcomputer Products, Inc. P.O. Box 105203 Atlanta, GA 30348 (404) 441-1617

*V.42 incorporates MNP 4 error correction.

ULTRA 96
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HayesConnect

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ULTRA 96 provides up to 4-to-1 data compression, so it can save you money by letting you run computer equipment at its maximum speed.

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It's available bundled with HayesConnect™ network server software, so any user on an AppleTalk® network has access to ULTRA™ performance.

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What's more, ULTRA 96 is compatible with the most popular high-speed modem on the market. The Hayes V-series® Smartmodem 9600.™

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Table 1: Features of 2,400-bps Modems, continued

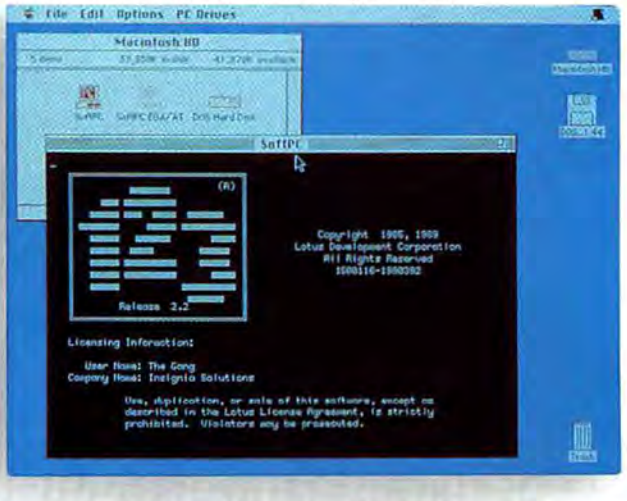
				
	Intel 2400EX MNP-Macintosh ★★★	**Mirror Technologies DM2405** ★★★½	**Prometheus ProModem 2400M Plus** ★★★★	**Zoom Telephonics Zoom/Modem V.42bis** ★★★★½
List price	$369	$197	$299	$300
Comments	Average performance. Limited software. Good warranty.	Low price includes optional $75 upgrade to MicroPhone II 3.0.	Easiest package to install. Average performance.	Excellent performance and price. Limited software.
Speeds (bps)	300, 1,200, 2,400	300, 1,200, 2,400	300, 1,200, 2,400	300, 1,200, 2,400
Standards supported	Bell 103, 212A CCITT V.21, V.22, V.22bis	Bell 103, 212A CCITT V.21, V.22, V.22bis	Bell 103, 212A CCITT V.21, V.22, V.22bis	Bell 103, 212A CCITT V.21, V.22, V.22bis
Error correction	MNP 4	MNP 4	MNP 4	V.42*
Data compression	MNP 5	MNP 5	MNP 5	V.42bis, MNP 5
Features				
Synchronous communication	●	●	●	●
Password, callback	○	○	○	○
Encryption	○	○	○	○
Remote configuration	○	○	○	○
Self-tests	●	●	●	●
Fax option	○	●	○	○
Accessories				
Hardware-flow-control cable	●	●	●	●
Bundled software	QuickLink II 1.1.3	MicroPhone 1.5	MacKnowledge 2.0	Zterm 0.85
Controls				
Front-panel controls	none	none	none	power
Rear-panel controls	power	power	power and volume	none
Status lights	8	8	8	8
Data-pump supplier	Intel	Intel	Intel	Rockwell
Size (W x D x H, in.)	5.5 x 9.6 x 1.5	5.5 x 9.6 x 1.5	6.4 x 11.4 x 2.4	7.75 x 11.4 x 1.75
Warranty	5 years	1 year	2 years	2 years
	Intel Corp. 5200 N.E. Elam Young Pkwy. Hillsborough, OR 97124 (800) 538-3373	Mirror Technologies, Inc. 2644 Patton Rd. Roseville, MN 55113 (800) 654-5294 (612) 633-4450	Prometheus Products, Inc. 7225 S.W. Bonita Rd. Tigard, OR 97223 (503) 624-0571	Zoom Telephonics, Inc. 207 South St. Boston, MA 02111 (800) 631-3116 (617) 423-1072

*V.42 incorporates MNP 4 error correction.

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The Best of UNIX and the Mac: A/UX 2.0

Surrounded by UNIX machines from Sun, DEC, Hewlett-Packard, Big Blue, and who knows what's NeXT? Teach your Mac industrial-strength UNIX.

BY
ALEXIS ROSEN,
JEFF PITTELKAU,
AND THE
MACUSER LABS
STAFF

Apple has finally delivered a UNIX system — A/UX — that's as elegant as the Macintosh, just in time to make the Macintosh a full partner in the workstation revolution. If you're a Mac loyalist lost amid UNIX workstations from Sun Microsystems, IBM, and others, you can now run with the crowd without giving up your Mac. And if you're a veteran user of the ubiquitous UNIX operating system — it dominates government, university, and scientific computing — and have always coveted the Mac's vast array of software, now is definitely the time to test-drive A/UX. MacUser Labs has been using and testing the new A/UX 2.0 for the past few months, and it easily meets or exceeds nearly all our expectations.



PHOTOGRAPHY: STEVE UNDERWOOD


A/UX

The original A/UX, version 1.0, introduced in February of 1988, was plagued with countless UNIX bugs and could run only one Mac application at a time — if you were lucky. Even the Mac's Finder wouldn't work. For example, instead of being able to dump unwanted files into the intuitive Trash, you were forced to type the UNIX `rm` command into a basic text interface — shades of the dreaded DOS. To run most of your favorite applications and UNIX on the same Mac, you had to restart the Mac every time you wanted to switch between the Mac operating system and UNIX. And compared with other UNIX systems, Macs running A/UX were sometimes painfully slow.

Today, with A/UX 2.0, all the serious bugs and incompatibilities have been fixed. Switching between Mac and UNIX programs is now as easy as clicking in a window. Mac applications can coexist with the UNIX command-line and X Window (a graphical-user interface standard for UNIX) programs, all in their own windows, and with the appropriate software (Insignia's Mac program SoftPC, for example), A/UX can even provide full DOS emulation.

UNIX According to the Mac

A/UX is a strong, clean port, with superb integration of different UNIX environments. It's a true System V Release 2.2 version of AT&T's UNIX — an enhancement of mainstream UNIX but not the most advanced version available. A/UX also supports most of the 4.3BSD (Berkeley Software Distribution) features — among them the indispensable job control. In addition, A/UX supports some parts of System V Release 3, such as streams (a programming interface), and includes all three standard UNIX command-interpreter shells (Bourne, Korn, and C) and many useful programs beyond the basic distribution (see the "A/UX for the UNIX Expert" sidebar).

A/UX starts up as a multiuser environment only, and after logging in your user name, you'll see the MultiFinder desktop. To do UNIX things, you switch to CommandShell, an application that starts up automatically. CommandShell is a multiwindow terminal emulator, much like the console or shell tools on typical UNIX workstations.

Figure 1: A/UX Performance

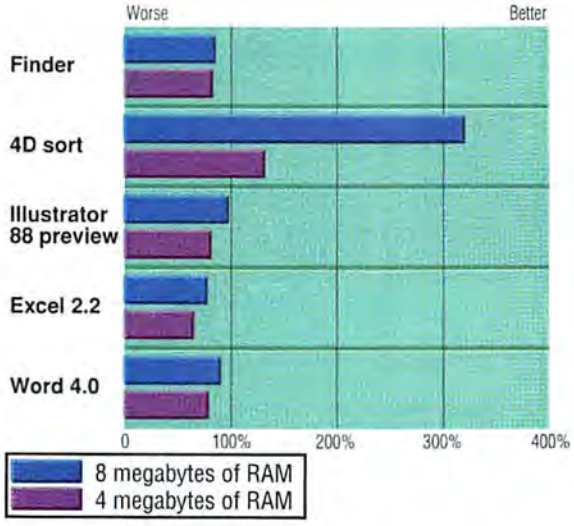


Figure 1a: Mac-Application Performance Under A/UX 2.0
Most Mac applications run more slowly under A/UX, especially in the stock 4-megabyte RAM configuration; adding more RAM to the Mac IIfx helped substantially. Our 4th Dimension sort test, however, was able to take advantage of A/UX's memory buffer; consequently, 4th Dimension ran much faster under A/UX than under System 6.0.5 (the 100-percent line represents System 6.0.5 performance under MultiFinder). Although at press time, 4D was not fully compatible with A/UX, we tested it because its database manipulation is performed mostly in RAM. Using 8 megabytes of RAM and increasing the A/UX memory buffer from 10 percent to 25 percent helped even more.

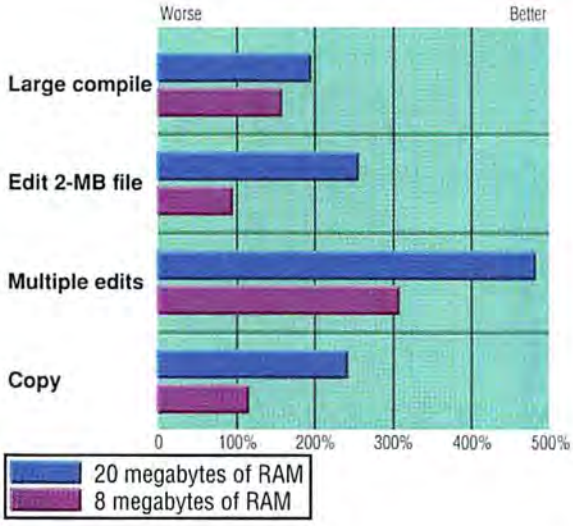


Figure 1b: A/UX Performance with Additional RAM
Adding RAM beyond Apple's 4-megabyte base configuration can significantly improve A/UX performance (the 100-percent line represents A/UX performance with 4 megabytes of RAM and a 10-percent memory buffer on the Mac IIfx). In particular, our multiple-edits test, which ran ten small editing tasks simultaneously, shows the need for more RAM for support of multiple users. Note that the edit-2-megabyte-file test has a big jump in speed between the 8-megabyte and 20-megabyte RAM configurations (both had a memory buffer of 25 percent); this occurs because A/UX stops using slower, disk-based virtual memory as soon as sufficient RAM becomes available.

CommandShell windows can be resized up to the limit of your screen, can use fonts in any size, and can remember the session so you can scroll back. You can copy or paste text among windows and other applications. If you start a lengthy operation in one window, you can open other windows and work in them while the first task is executing.

A simple Mac text editor called TextEditor (actually derived from the Macintosh Programmer's Workshop) comes with A/UX. It has just enough power to do the job, besides fulfilling its purpose of replacing vi in the hearts of UNIX hackers everywhere. Because TextEditor is much easier to use than vi, you'll probably find yourself using it for editing small shell scripts and source files.

A/UX provides a translation layer that makes the A/UX file system look like a Mac file system, visible to all Mac applications. Mac programs (such as TextEditor) can manipulate UNIX files, and you can drag UNIX files in the usual way onto Mac disks. You can keep Mac files in the UNIX file system and use them normally from Mac programs, but Mac disks are not available to UNIX programs.

Driving A/UX for the First Time

The required platform for A/UX 2.0 is a Mac II with an optional PMMU (Paged Memory Management Unit) chip or any Mac based on the Motorola 68030 chip (which has built-in memory management). Apple specifies a minimum of 4 megabytes of RAM as well as an 80-megabyte hard-disk drive to obtain adequate A/UX performance, but see the "Setting Up an A/UX System" sidebar for our preferences.

A/UX starts up when you double-click on an application called, simply enough, A/UX Startup. This application can launch automatically or provide you with a command-line window for performing diagnostic and maintenance tasks. Once A/UX has started, the Mac can simultaneously act as a UNIX workstation and display the active MultiFinder desktop.

But you'll notice some changes to the Mac environment. The UNIX boot disk mounts first with the name / (as is normally true for any UNIX file system); all other A/UX volumes mount inside directories (folders).

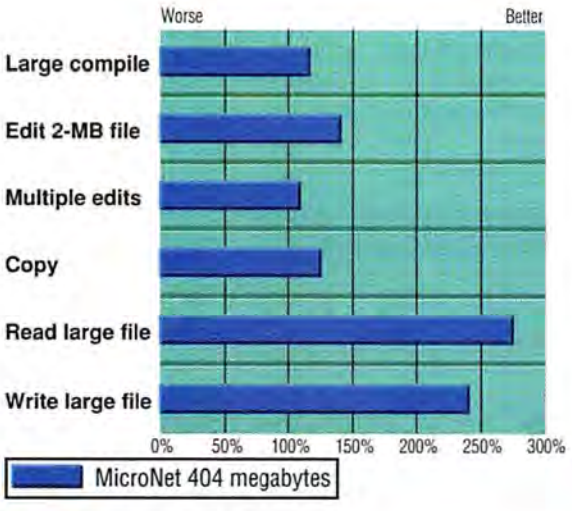


Figure 1c: A/UX Performance with a Faster Hard-Disk Drive
By purchasing a large, fast hard-disk drive and installing A/UX yourself, you can realize a significant performance boost over the preconfigured 80-megabyte Quantum drive Apple sells. The 100-percent line represents A/UX performance with the stock Apple Internal 80SC hard drive, using 8 megabytes of RAM and a 25-percent memory buffer on the Mac IIfx. The MicroNet 404-megabyte drive offers higher sustained data throughput and shorter average seek time than the Quantum drive we tested.

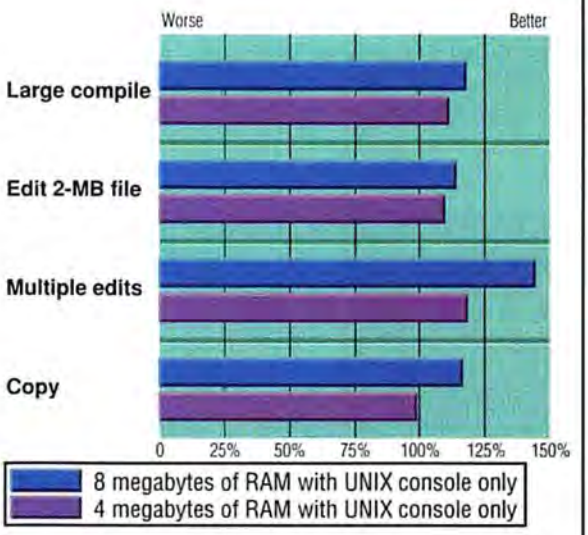


Figure 1d: A/UX Performance Without Mac Operating System
We ran UNIX tests on our tuned IIfx system with and without the Mac environment. When the Mac OS wasn't active, we saw an average 10-percent increase in UNIX performance ("console only"). The 100-percent line represents A/UX performance with both UNIX and Mac operating systems active, using the stock Apple Internal 80SC hard drive and 4 megabytes of RAM (with a 10-percent memory buffer) on the Mac IIfx. As our 4-megabyte results show, the lower the available RAM, the more the presence of the Mac operating system costs you in performance.

Then individual users' home folders appear, followed by other Mac partitions and disks (this version of A/UX 2.0 can mount only the first Mac partition on each disk). UNIX sessions happen inside CommandShell, which supports up to 16 simultaneous sessions in addition to a system-console window.

For users familiar with the Mac's point-and-click simplicity, the UNIX text-command interface (command line) may seem intimidating. A/UX 2.0 has a solution called *commandos*, available for almost all the common UNIX commands and for various system-configuration scripts. On the command line, you can type a command you'd like to use, such as `ls` (which lists files and their attributes). But instead of typing the rest of the options, such as file ownership and access privileges, you can press Command-K, after which a dialog box appears. There you can click on appropriate radio buttons and check boxes — with real-time help to guide you. When you've finished, clicking on the highlighted ls button (or pressing the Enter key) generates a syntactically correct command line.

The Mac According to UNIX

A Mac running A/UX 2.0 looks a lot like a regular Mac. MultiFinder is standard, the desktop works normally, and most applications behave in the usual way. Most Mac users don't even realize that A/UX is running.

There are a few twists, though. Thanks to the magic of virtual memory, which uses the Mac's memory-management capabilities and temporary swaps to the hard disk, A/UX can increase memory (yielding up to 16 megabytes) provided to the Mac environment from the available RAM. For all UNIX functions, virtual memory is limited only by the swap partition's size on the hard disk or by the A/UX ceiling of 4 gigabytes. Even so, multiple users would quickly bog down an A/UX station that depended too much on (slower) virtual memory instead of RAM.

MultiFinder with A/UX is a little nicer than MultiFinder without. It lets you hide all of an application's windows with a single menu choice, and the application's windows reappear when you choose the application from the Apple menu. Alternatively, you can hide everything except the current application if you want to tidy up your desktop temporarily. This is particularly useful when you're looking for an icon on the desktop and an application's document windows are in the way. A/UX DAs each have their own MultiFinder layers, as in version 7.0 of the Mac operating system.

To start working with A/UX, you must log in with a user name and password so the Mac knows who you are. This lets the Mac maintain separate System Folders for each user — which means that when you customize your Mac with a zillion INITs and type fonts, you won't annoy any colleagues who also use that machine.

One slick extension to the A/UX MultiFinder is its way of showing your access rights to various files. UNIX lets you protect each file in a variety of ways; for example, some personal UNIX files are readable by everyone but writable only by the files' owners. A/UX translates these protections into the equivalent AppleShare access privileges (which have been extended in some minor but logical ways) and uses the standard AppleShare interface.

What Is UNIX, and Why Should You Care?

Most Mac users don't think about computer operating systems. For better or for worse, Macs make it easy to forget about such complicated things. But, as do other computers, the Mac does have an operating system.

The Mac OS code lives mostly inside the ROM (read-only memory) chips, but big parts of it live inside the System file, kept in the System Folder along with the Finder and MultiFinder files that create the familiar desktop. The OS provides various services to user programs such as word processors. These services manage menus, disk files, memory, windows, and so on. MultiFinder is an extension to the OS that provides another level of services: a multiple-program manager and a window-layer manager, among other things.

So what is UNIX? It's simply another OS. It corresponds roughly to the Mac ROMs and System file or to DOS. UNIX has a few properties that distinguish it from the OS pack, however.

From its very first moment, UNIX was designed to be a multitasking system, serving many users simultaneously. It was designed to appeal to technical users by providing their most desired features. It was written in C, a high-level language. Most important, its authors didn't restrict it to a single type of machine (although UNIX remains a registered trademark of AT&T, its primary developer).

Early users, almost all of them programmers, added a huge assortment of software tools, which generally worked well together. Thus UNIX became a rich software environment, attracting even-more-technical users.

Because it was written in a convenient language (unlike many other operating systems) and because it was relatively unrestricted, UNIX quickly developed many versions that moved to an incredible number of different machines. Today it is almost impossible to find a computer that can't run a version of UNIX. It's available for everything from IBM PS/2s to Macs to Cray supercomputers.

The wide availability of UNIX on many workstations has made it the OS of choice for many high-tech programs such as those for advanced CAD or mathematical modeling. UNIX systems are also the dominant choice for the fast new RISC (Reduced Instruction Set Computer) workstations.

If you work in an environment with a lot of UNIX machines (an increasingly common situation), having UNIX on your own Mac can make communication — such as printer, mail, news, and disk sharing — with the other computers relatively easy. Equally significant is access to the vast computational power of UNIX hosts, specialized software, and networks.

If your company has a custom-developed program written in UNIX, you might need to have a computer other than a Mac at your desk. But if you have a Mac with version 2.0 of A/UX installed, you'll get the benefits of the Mac OS and UNIX simultaneously.

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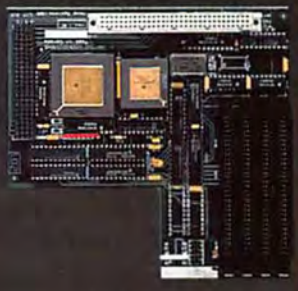
NewLife 25Plus

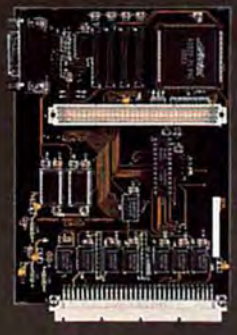
- 68030 accelerator and 68882 math co-processor running at 25 MHz for the Mac 128K, 512K, 512Ke and Plus
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To be truly compatible with A/UX (and eventually Mac's System 7.0), applications must be "32-bit clean" — which is the case for nearly all popular Mac applications. As time passes, this will be less of an issue. For programs that are not 32-bit clean, A/UX allows a 24-bit session that runs them with a few restrictions.

With INITs, compatibility is currently a big problem, although things are getting better. By the time you read this, many of the most popular commercial (but not necessarily public-domain and shareware) INITs will have been updated. Apple and its A/UX-authorized dealers distribute a list of programs and hardware known to work with A/UX 2.0 called *A/UX 3rd Party Product Guide;* the list is also downloadable by AppleLink subscribers.

Basic Installation

Apple's introductory booklet *Road Map to A/UX* is one of those rare gems that spans the experience range — it's helpful to UNIX neophytes and A/UX aficionados alike. Start by reading this booklet from cover to cover.

Apple now sells A/UX on four media: on floppies, on tape, on CD-ROM discs, or preinstalled on external or internal hard-disk drives. You can use the preinstalled version as soon as you turn on the hard-disk drive. All other versions must be installed onto your existing hard disk. The installation procedure is identical for each type of medium; if you install from 1.4-megabyte floppies, however, you might fall asleep while inserting all 40 of them, one after another, into the Mac.

Unfortunately — and it's *very* unfortunate — the only tape format supplied for installation is for the slow Apple Tape Backup 40SC, a 40-megabyte drive that came in last in our December '89 report "Getting It on Tape," page 189.) This leaves the CD-ROM discs or the pile of floppies as the realistic installation alternatives for people who already own Macs or who don't want Apple hard drives. If you need a tape drive to back up after installation, see the *A/UX 3rd Party Product Guide,* which lists larger-capacity alternatives.

Normally, installation of the basic A/UX system from CD-ROM discs takes about one and a half hours, and the Mac spends most of that time loading A/UX automatically onto the hard drive (requiring little user attention). The manual, *A/UX Installation Guide,* is in the typically excellent Apple style, with key sections clearly labeled.

The only tricky part is correctly partitioning your hard-disk drive before installing A/UX. If you are using standard Apple equipment (an 80- or 160-megabyte hard-disk drive) and you want a standard setup, it's very easy to do. As the manual explains, you just run the HD SC Setup program to prepare your disk drive for A/UX. This takes just a few mouse clicks and a few minutes' wait. But if you're not using a standard Apple disk or partitioning scheme, you'll have to do some extra work (see the "A/UX for the UNIX Expert" and "Setting Up an A/UX System" sidebars).

A/UX for the UNIX Expert

Warning: You're entering an area in which your command of the English language may be of little value, because UNIX-system administrators use a rich alphabet soup of acronyms when describing UNIX compatibility and functionality.

In essence, A/UX 2.0 is a complete software translation of AT&T UNIX System V Release 2.2. Digging deeper, A/UX is compatible with the following standards:

- IEEE POSIX 1003.1-1988.
- AT&T SVID (System V Interface Definition).
- ISO 9945-1.
- FIPS #151-1.

In addition to the System V base, A/UX incorporates most of the features of Berkeley Software Distribution 4.3BSD (developed at the University of California, Berkeley), such as

- FFS (the Fast File System).
- Real job control (with the Korn or C shells).
- lpr print spooler.
- BSD libraries and C-compiler compatibility switches.
- Source Code Control System.
- Many programs in /usr/ucb, such as finger and compress.

A/UX provides a wide variety of Ethernet software, including

- Basic TCP/IP services such as TELNET and FTP.
- Berkeley B-NET: rlogin, talk, rcp, and so on.
- NFS 3.2 with Yellow Pages, including server capability.
- Sendmail 5.61.

A/UX comes with SLIP (Serial Line Internet Protocol) software. It also supports serial-line access with kermit, cu, and tip. Serial-port log-ins are supported normally. All the A/UX serial software, including getty, respects UUCP (UNIX-to-UNIX Copy Protocol) locking files.

UNIX support for LocalTalk is limited to printing: lpr is for spooling, and atprint is for immediate output. PostScript printing is strongly supported, with tools such as transcript.

In addition to its UNIX capabilities, A/UX provides a nearly complete Mac environment, including MultiFinder and System 6.0.5. All 32-bit-clean Mac programs run if they don't use supervisor-mode instructions or the few missing parts of the Mac Toolbox, meaning that almost all the most popular Mac applications run.

A/UX offers Mac OS-software support for LocalTalk and EtherTalk and can support either protocol simultaneously with TCP/IP services or with Ethernet.

Although A/UX is remarkably complete, it does have a few holes. One of the most glaring problem areas, UUCP, is an ancient UNIX System V version with many bugs. Some of the support programs do not work, and the sendmail configuration file does not work properly.

A/UX supports networking extremely well, but we'd really like to see it have easy Mac-style network administration. Likewise, there is fairly strong support for security but no single configuration command to make a system secure (or insecure).

It uses an asynchronous SCSI manager that differs from the

Performance

A/UX is a very solid UNIX system — unless your work requires lots of UNIX computing power *on your desktop*. Then you'll have problems with Mac hardware performance. Currently, the IIfx is the fastest Mac you can buy. When running A/UX, it can't provide the UNIX speed of the average workstation (such as the Sun SPARCstation 1+). So if you're a professional programmer who already waits too long for big compiles to finish or if you're an engineer who spends your life inside a CAD program, you might find A/UX on the IIfx too slow.

Other users will find the IIfx fast enough, however, and many will also consider the new IIsi fast enough. And if all the heavy-duty work in your office is done by a central server — perhaps the departmental Cray supercomputer or (more realistically) a high-end RISC (Reduced Instruction Set Computer) machine such as the IBM RS/6000 — the Mac's performance may be less of an issue and A/UX can still be a good option.

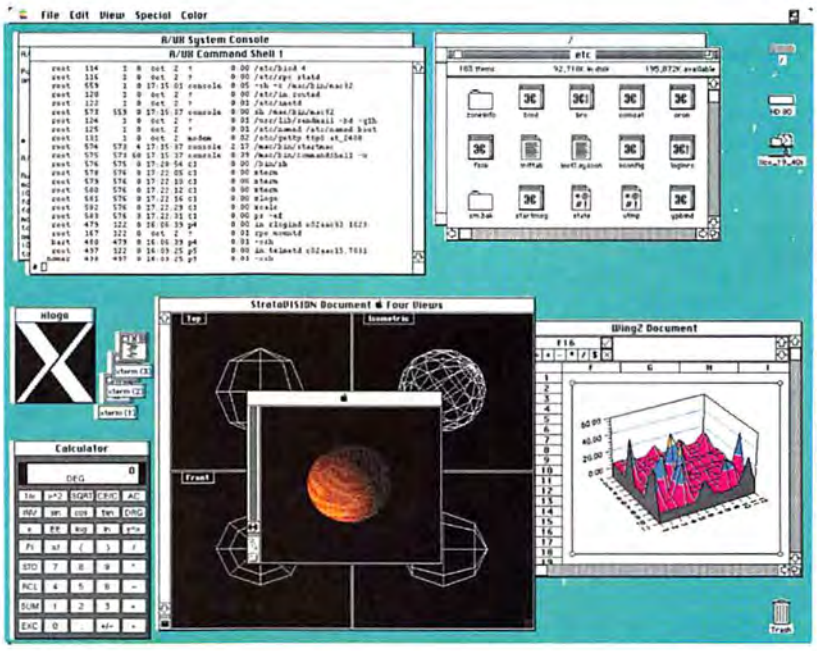


Figure 2: A/UX 2.0 can display UNIX, Mac, and X Window applications running simultaneously. A typical session with A/UX 2.0 could involve cutting and pasting text between its CommandShell windows (upper left) and any UNIX or Mac applications. The familiar MultiFinder interface displays the A/UX root disk / (upper right), Mac partitions, and AppleShare volumes, plus all your favorite Mac programs and productivity tools (such as StrataVision and WingZ, bottom right). The optional X Window System for A/UX displays several applications (lower left) running on remote UNIX computers.

Mac's. As a result, some peripherals (such as optical scanners) that use the Mac's synchronous SCSI calls won't work under A/UX unless you create a custom software driver (following the guidelines in the Apple document *Writing A/UX Device Drivers*). However, most peripheral devices such as LaserWriters are LocalTalk or serial devices, which are fully supported under A/UX.

File Systems

A/UX 2.0 supports three file systems — SVFS (System V File System), FFS, and HFS (Hierarchical File System) — and three Mac file formats — UNIX, AppleSingle, and AppleDouble. UNIX disks can come in two formats: SVFS and FFS (sometimes called UFS). FFS is a much better way to format disks, and it's the default in A/UX 2.0. But SVFS is still supported, and any disks made with A/UX 1.1.1 (or earlier) are in that format. If you have any disks in the SVFS format, you should convert them to FFS format (but make sure you have a backup!) to improve performance.

MultiFinder, like other Mac programs, sees the UNIX file system (FFS or SVFS) as just another part of the Mac's HFS . But there's a lot of magic going on behind the scenes to make this work. The magic can make some disk operations slower on a UNIX disk than on an equivalent Mac disk. In particular, looking through directories (folders) is much slower. On the other hand, operations with single files can be somewhat faster, because the A/UX disk cache works better with UNIX disks.

If you do put Mac files onto the UNIX file system, they can be in one of two formats. Every Mac file has two parts — the resource fork and the data fork. The default format on UNIX disks, AppleSingle, combines both forks into one UNIX file. This is convenient, but performance when using AppleSingle files or programs can be poor, as the format-translation magic has to work much harder. The alternative is to use the AppleDouble file format.

A Mac file in AppleDouble format is separated into two separate files. One file contains the data fork and has the same name as the original file; the other file contains the resource fork and has the same name except for a % at the beginning. For example, MyMacFile would be stored in AppleDouble format as MyMacFile (the data-fork file) and %MyMacFile (the resource-fork file). There is virtually no performance loss when you use files stored in AppleDouble format.

One important problem with AppleDouble files is that it's very easy to lose one of the two pieces if you forget about it when you move the file at a later date. A program needs both forks of the file to work.

Apple provides a UNIX tool, fcnvt, that translates between AppleSingle and AppleDouble files. It also handles other common formats, such as MacBinary, plain triple, and binhex. You can learn more about this useful tool by reading the on-line manual (type `man fcnvt` in a CommandShell window).

Sometimes there are good reasons to put Mac files onto UNIX disks. If you do, be aware of the performance issues and consider using the AppleDouble format.

Setting Up an A/UX System

Which Mac?

Once you've decided on A/UX, the first question is easy — which Mac should you use? A Mac IIcx, SE/30, or Mac IIx can run A/UX, but we found them to be painfully slow for all but the lightest use.

The Mac IIci is reasonably fast, especially for disk-related tasks. It still can't compare to a RISC-based workstation, though. By press time, we weren't able to run A/UX tests on the new Mac IIsi, but we believe that its performance falls somewhere between that of the Mac IIcx and the IIci.

The fast Mac IIfx is the clear choice for A/UX tasks, but considering its speed relative to the IIci under the Mac OS, the IIfx running A/UX was slower than we expected. This is mainly because A/UX makes poor use of the IIfx's fast SCSI hardware. Apple is working on this problem, and we have already tested the improved A/UX 2.0 that speeds up IIfx disk performance.

How Much Memory?

Once you have a Mac, you need memory. Our tests show clearly that you pay a tremendous penalty for running with only 4 megabytes of RAM. If you can, you should have at least 8 megabytes of installed RAM. If your Mac will support multiple users or will do a lot of UNIX work, 20 megabytes is the optimal configuration. In most cases, the extra money needed to reach the IIfx's maximum 32 megabytes would be better spent on a bigger, faster hard-disk drive.

The A/UX memory-buffer cache interacts with all read/write disk operations and is more efficient than the Mac's Control Panel RAM cache, so you should deactivate the Control Panel cache under A/UX. We found that setting the A/UX memory-buffer cache to 25 percent instead of the default 10 percent improved performance (see "A/UX Performance with Additional RAM," Figure 1b).

Which Disk Drives?

The 80-megabyte hard-disk drive that Apple supplies with Macs is not a particularly fast drive. Furthermore, 80 megabytes is inadequate for any serious UNIX work. If you can afford to purchase the CD-ROM version of A/UX and a suitable CD-ROM drive, this would be the preferred medium (see the "Capsule Review" sidebar), but don't even think of running A/UX from the CD-ROM disc itself. If you can't afford to go the CD-ROM route, buy the floppies and a big, fast third-party hard drive.

If you must have an Apple hard-disk drive, you'll find the 160-megabyte drive acceptable. Another possibility is a large Seagate/Imprimis hard drive, which offers the necessary high data-transfer rates and low seek times. We obtained excellent performance with a variety of these.

Many third-party hard-disk drives don't come with software that can format them for use with A/UX, but La Cie's Silverlining can format most manufacturers' drives for A/UX. We have also used the MicroNet formatter and drives with excellent results.

The optimal mixed Macintosh and A/UX system would have A/UX and Mac partitions on each of two hard disks, for even sharing of the disk-access load. Place the UNIX root-file system and disk-swap partition (for virtual memory) on the faster disk. The A/UX root partition should be at least 100 megabytes, with a 16-megabyte-to-32-megabyte virtual-memory swap, and the optional Eschatology partition (which backs up critical files for hard-disk auto-recovery) set at 4 megabytes.

Which Backup Device?

Any backup device capable of backing up your entire hard disk, entire A/UX partitions, or entire SCSI partitions can handle A/UX backup. If you wish to back up incrementally, or file by file, you can use UNIX utilities such as tar (A/UX-compatible drivers are required); the A/UX Commando facility simplifies this process. Currently, you can do backups of an entire disk only when A/UX is not running.

Several companies, including FWB and MicroNet, provide custom driver software for DAT (digital audio tape), TEAC, and other backup drives for A/UX. DAT would be a superb but expensive option. A/UX-compatible erasable optical drives would likewise be expensive, but among their advantages (see "Erasable Optical Drives," November '90, page 102) would be their potential ability to start up your Macintosh from a "mirror image" backup of your hard disk if your drive ever dies.

At press time, FWB, Inc., had introduced additional A/UX drivers for its entire line of hard-disk drives and tape drives. The custom drivers can also operate devices from many other vendors. Special features include multithreaded disconnect/reconnect, allowing simultaneous access to six SCSI tape drives.

Which Monitor?

We have used a wide variety of 1-bit-to-8-bit monitors with no glitches. A/UX fully supports 32-bit QuickDraw, so you should have no problems with the Apple 8•24 and 8•24 GC graphics cards or third-party 24-bit cards such as SuperMac's Spectrum/24 Series III, and many others. Consult Apple's updated A/UX-compatibility list before purchasing a third-party monitor, video card, or graphics accelerator.

Which Ethernet Card?

A/UX has built-in support for Apple Ethernet NuBus cards. Similar cards from Asanté, Racal Interlan, and Cayman are faster, often cheaper, and equally well-built (see "300 Best Network Products," June '90, page 139). Ethernet cards are available for both NuBus slots and slots for the SE/30, in 10BASE-2 and 10BASE-T formats. Setting up Ethernet takes less than an hour: Just power down, install the card, power up, and answer the questions in the newconfig program before restarting. You need to give the Mac a name and address plus the names of the other machines in the network.

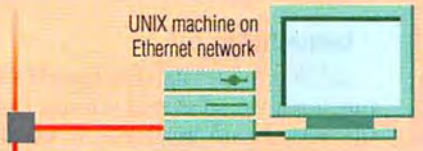
Which Serial-Port Board?

If you use more than two serial ports, you'll need an expansion card. We've used the Taniwha Systems CommCard for more than a year. It works well, comes with built-in support for the UUCP g protocol, and works with the Macintosh Communications Toolbox; support is excellent. Other manufacturers also provide serial-port boards.

Which Mouse?

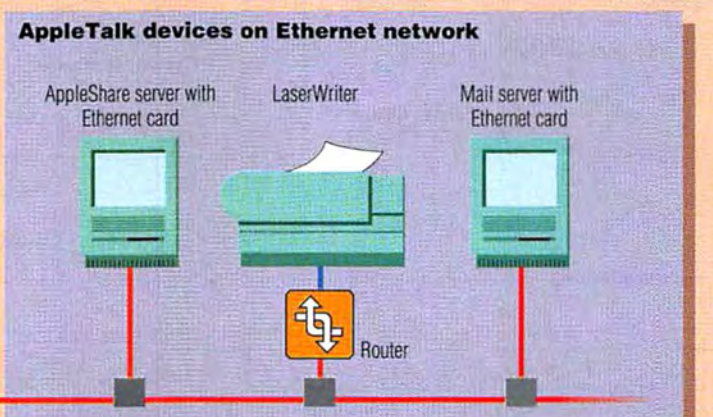
Many UNIX programs require a three-button mouse, and the only way to mimic one with the standard Apple one-button mouse (or an equivalent trackball) is to perform keystrokes simultaneously with the mouse click. As A/UX takes hold in the UNIX market, hardware vendors will offer a variety of A/UX-compatible three-button mice. For now, we can recommend the new three-button SuperMouse/GMPU combination from Advanced Gravis (Burnaby, British Columbia, Canada).

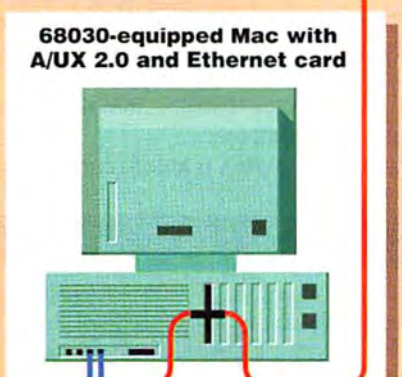
A/UX 2.0 gives you easy access to the common networking environments of UNIX and the Macintosh.



TCP/IP

A/UX supports standard TCP/IP (transmission control protocol/Internet protocol) communication over Ethernet to other UNIX computers. To use TCP/IP, you need to install an Ethernet card in your Mac and configure it as a TCP/IP node. A/UX supports networking protocols commonly available on UNIX machines, including NFS (Network File System) for sharing files, TELNET for remote log-ins, and SMTP (simple mail transport protocol) for sending and receiving mail.



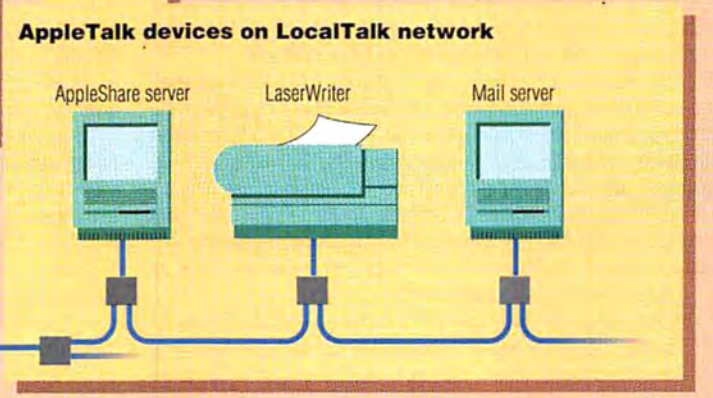


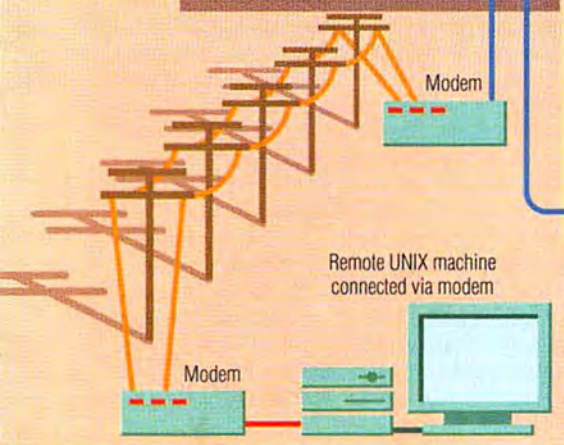


AppleTalk

A/UX provides AppleTalk connectivity over LocalTalk or EtherTalk networks, plus it has an IP (TCP/IP or SLIP) connection. When both an Ethernet card and a LocalTalk connector are installed, you can choose between networks by using the Network cdev and then restarting your computer.

Once you've selected an AppleTalk network (and a zone in the Chooser), you can select AppleShare servers and AppleTalk printers, including the LaserWriter, AppleTalk ImageWriter, and ImageWriter LQ. The A/UX lpr utility prints to the current Chooser-selected printer. At press time, no E-mail client software package, including QuickMail and Microsoft Mail, was compatible with A/UX 2.0. Until such software is compatible, you need a gateway to SMTP to send and receive mail between your A/UX Mac and the mail server.





SLIP

If you're planning to use A/UX in a stand-alone or non-Ethernet environment, your A/UX Mac can talk to other A/UX Macs and UNIX computers by using a serial connection (either locally or via modem) and SLIP (Serial Line Internet Protocol).

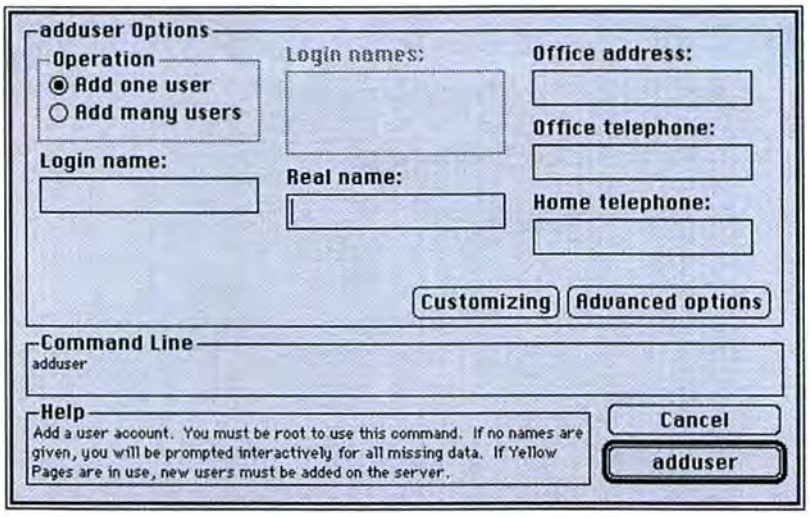


Figure 3: Many UNIX system-administration tasks — such as the addition of a new user — are simplified by the A/UX commando utility. A commando builds the necessary text commands after you've clicked on various radio buttons and check boxes and entered necessary information in fields within the dialog box. There is also a permanent Help message.

Apple is planning a top-of-the-line Mac based on the Motorola 68040; this future Mac should be able to compete with low- to midrange UNIX workstations, including those from NeXT Computer.

As configuration is a complicated issue, it's difficult to make safe comparisons with other UNIX workstations, but subjectively speaking, a decently configured IIfx with A/UX (see the "Setting Up an A/UX System" sidebar) seems as fast as the lower-end RISC boxes, such as the Sun IPC. However, a large part of the perceived speed of the Mac comes from its finely tuned human interface, which is generally superior to (and feels faster than) other graphical user interfaces for UNIX.

Connectivity

A/UX provides standard LocalTalk functionality, so shared printers and file servers are available as usual. The normal Chooser DA offers the usual icons in its dialog box (LaserWriter, AppleTalk ImageWriter, AppleShare, and so on). If you regularly receive large amounts of data over LocalTalk (perhaps from a file server) on anything less powerful than a Macintosh IIfx, however, A/UX's performance will suffer drastically.

If your Mac has an Ethernet card, it can use EtherTalk (Phase 2 only) to communicate with any other EtherTalk device on the network, without disrupting A/UX in any way. To switch between LocalTalk and EtherTalk, you need to make a few basic tweaks and then restart the computer.

A/UX is able to employ LocalTalk

Alternix

Some unlucky folks won't be able to use A/UX. Maybe the cost is too high, your favorite program won't work with it, or your company has a policy against A/UX. Don't despair: You can still have access to the world of UNIX with these alternative UNIX products:

If you want to connect your Mac mail system to a UNIX network, you have many options. Cayman sells bridges to both QuickMail and Microsoft Mail, which talk to an SMTP (Simple Mail Transport Protocol) UNIX mail server. A wide variety of UNIX mail or gateway products are available from Alisa, Pacer, CE Software, and others.

Apple's MacX and White Pine's eXodus are both X Window servers for the Mac. When you're running under MultiFinder, these programs let you support multiple X Window sessions at the same time as you're using normal Mac applications.

Wollongong's PathWay Client NFS lets you mount an NFS server on your Mac desktop in the same manner as you mount an AppleShare volume. No gateway or host software is required — just a cdev in the Mac.

DuPont sells a powerful single-board UNIX computer, the MacBLITZ, that plugs into a Macintosh NuBus slot. This computer is based on the Clipper processor, a moderately fast RISC chip that DuPont claims can run at about 14 MIPS (million instructions per second). It sports 8 megabytes of RAM; a fast, thin-wire Ethernet port; a high-performance SCSI port; and DuPont's implementation of AT&T UNIX System V Release 3. A normal Mac program talks to the board via NuBus, providing multiwindow terminal access to the MacBLITZ. DuPont has developed software that lets the MacBLITZ act as an AppleShare file server, print spooler, and network router for an entire network of Macs without tying up the host Mac.

In all, the MacBLITZ is an impressive achievement, but its cost is high (from $9,995 to a potential maximum of $19,500 for the 50-megahertz version with 32 megabytes of RAM). You could get an equally powerful RISC workstation for less money, and you'd have it in a separate box with its own power supply, monitor, and keyboard. You would then have all the same features, including multiwindow terminal access from the Mac, that the MacBLITZ provides.

An excellent Mac-to-UNIX connectivity product is TCP/Connect II. This program, from InterCon Systems, supports standard TELNET and FTP (file-transfer protocol) as server and client. It emulates a wide variety of terminals, including VT102 and VT220. But the neatest parts are the mail and news interfaces. The mail interface talks to any SMTP server, providing a Mac front end to UNIX mail. The news interface talks to an NNTP (Network News Transport Protocol) server and provides a Mac front end to netnews software. TCP/Connect can connect to hosts via EtherTalk, MacTCP, SLIP, and so on.



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connections for printing, but that's the only instance when its UNIX programs make use of LocalTalk. The lpr print spooler uses the device selected in the Chooser, which can be a LaserWriter on LocalTalk, as its default printer.

For standard UNIX services, you need an Ethernet card and an Ethernet network. Apple provides drivers for its Ethernet card, so Apple's card or any compatible one (such as Asanté's) works fine. We put a Sun SPARCstation IPC and a NeXT computer onto the same Ethernet network with our A/UX Macs, along with a Macintosh running TCP/Connect II, and they were all able to communicate correctly with each other. The only weakness: A/UX requires a nameserver — a machine on the network that resolves addressing information — to send mail to remote UNIX hosts, including other A/UX Macintoshes.

Apple provides the standard Yellow Pages and NFS (Network File System) software. When you install A/UX, NFS configuration is largely automatic; we installed an A/UX system with NFS and had no problems publishing and mounting from a Sun SPARCstation IPC as well as from a NeXTcube.

Who Needs It?

Most current UNIX users need A/UX, although some don't know it yet. One good reason to use UNIX is portability; applications developed for one UNIX platform are easy to translate (port) to other systems. However, most UNIX systems come only with basic text editors such as vi and emacs (UNIX is littered with alphabet-soup program names), which are no easier to use than DOS text editors on IBM-compatible PCs. Furthermore, there are few standard UNIX spreadsheet programs to go along with these editors. The contortions that UNIX users must perform to do common productivity tasks, such as write a nice-looking memo, are too painful for most people to bother learning.

With A/UX, however, you're not faced with these limitations. You have the intuitive MultiFinder for managing UNIX and Mac file systems, and A/UX's text editor, TextEditor, which is easier to use than the traditional UNIX text editors, such as vi or troff or nroff. You can also run your favorite Mac word processor and cut and paste into a UNIX file. And as you're working on a Mac, you can switch to Mac applications such as spreadsheet programs and sophisticated database managers and can create video or slide presentations.

A popular alternative solution for making UNIX easier to use is the X Window system, a windowing environment developed at MIT (see the "Alternix" sidebar). X Window is the foundation for various graphical user interfaces (such as AT&T's OPEN LOOK, which Sun has made popular). However, not all users need the power of a Hewlett-Packard 9000 or a Sun SPARC workstation at their desks, so many UNIX-heavy sites have turned to X terminals as a cheap solution (these machines provide the hardware necessary to display the X Window environment while the real

On the Horizon

One of the promising things about the new A/UX is that Apple has committed to timely updates, the first of which (2.0.1) may ship in the first quarter of 1991. The most important feature of A/UX 2.0.1 will be its support of the Mac IIsi (which Apple plans to configure for use with A/UX) — you'll then be able to buy a reasonable A/UX platform for a street price of around $4,000. There will probably be other enhancements and bug fixes: a major upgrade of the Korn shell (and awk), taken from the latest AT&T source; support for multiple monitors; fixes to UUCP; improved serial-port drivers; enhancements to CommandShell; Sendmail 5.64 and a working sendmail-configuration file; all the current patches to 2.0, including the IIfx SCSI fix; and more new commandos and easy-to-use shell scripts.

At press time, Apple announced that it had joined the two major UNIX consortia: UNIX International and the Open Software Foundation. These rival standards organizations, which Apple had previously rejected, will determine a major part of future UNIX development. How Apple will expand A/UX's role in the UNIX game while playing on opposing teams remains to be seen.

One of our criticisms of A/UX is that the 2.0 distribution disks don't contain any of the really good, free UNIX software now available. Lots of folks at Apple are aware of this issue, and it seems likely that a new CD-ROM disc containing all sorts of goodies may be available by the time you read this. The disc would probably contain popular UNIX source programs, with versions fully compiled for A/UX. We expect that it would include news software (such as Bnews, Cnews, rn, and nn), tcsh (an extended C shell), and other popular UNIX programs. It will also probably come with gnu software utilities such as emacs, gcc, and gdb.

This CD-ROM disc will probably be sold for the cost of distribution, so start saving up for a Mac-compatible CD-ROM drive if you don't already have one — it'll be worth it to have this disk. (See "Most Valuable Players," March '90, page 150, for guidance in selecting CD-ROM drives.)

If Apple itself doesn't take responsibility for providing fast, large-capacity, A/UX-compatible tape-backup drives, we can expect third-party vendors to come out quickly with such drives (and more-adaptable software).

MicroNet has also developed a high-speed SCSI NuBus board. We haven't tested it with A/UX yet, but based on our experience with it under the Mac OS, it could be just the thing to put new life into a tired old IIcx. Other vendors are also working on SCSI boards.

When we prepared this report, some Mac programs — mostly INITs that we'd rather not live without — still didn't run with A/UX, although most of them will be able to by the time you read this. CE Software (QuicKeys, QuickMail, and Alarming Events) and Icom Simulations (On Cue II) claim to have A/UX-compatible versions that should be ready soon. And finally, even if your favorite Mac program already appears on Apple's A/UX-compatibility list, try to get a few second opinions about its compatibility by checking the UNIX and Mac forums on the larger on-line services.

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12101B

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computation takes place at a remote central mainframe or minicomputer). This is an attractive solution, but it leaves the individual X terminals at the mercy of the central systems and their maintenance schedules. Further, most users don't need a mainframe's tremendous computing power.

If you're thinking about buying an X terminal (such as the DEC VT1000), you should think about getting a Mac IIsi instead — once Apple has upgraded A/UX to support this new model (see the "On the Horizon" sidebar). Although some X terminals may cost $2,000 less than a Mac IIsi, the Macintosh is a vastly more capable machine. It can not only provide the complete X Window interface but it can also run UNIX as well as Macintosh applications locally.

Who Else Needs It?

Before A/UX 2.0 shipped, a Macintosh telecommunications program and a modem (or network links) were always necessary in order to connect to a UNIX workstation or host mainframe. Now, if you are running A/UX, you can do a lot of UNIX work at a Macintosh on your desk. If you still want to dial out to a UNIX computer, you're able to —

Capsule Review



A/UX 2.0

★★★★½

Offering nearly flawless integration of the Mac interface and UNIX connectivity, this second release of A/UX is a reminder that Apple employs some of the world's best programmers. Mac functionality is complete, and all the important UNIX tools have ported with a minimum of problems. Primary limitations are tied to CPU power, RAM, and hard-disk speed and how much of them you can afford.

Pros: Simultaneous highly efficient use of MultiFinder, Mac programs, and full UNIX power. Commando facility tames UNIX command language. Good product support. Access to Mac's real-world productivity software.

Cons: Needs improvements to CommandShell, UNIX communication via serial ports, and default-RAM utilization. Inadequate tape-backup software and hardware (third-party options are necessary). Expensive if used solely for UNIX connectivity.

Published by: Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; (800) 538-9696 or (408) 996-1010.

List Prices:

Preconfigured A/UX CPUs (include A/UX Accessory Kit and 30 days of Technical Answerline Service support; keyboard and monitor not included):

- Macintosh IIci CPU with 4 megabytes of RAM, 80-megabyte hard-disk drive with A/UX preinstalled, $7,269
- Macintosh IIfx CPU with 4 megabytes of RAM, 80-megabyte hard-disk drive with A/UX preinstalled, $10,469

Media (include A/UX Accessory Kit and 30 days of Technical Answerline Service support; require 4 megabytes of RAM and Mac II with PMMU, SE/30, IIx, IIcx, IIci, or IIfx):

- External 80-megabyte hard-disk drive, SCSI cable, and terminator with A/UX preinstalled, $2,395
- Tape cartridge (QIC-100 format) with A/UX system software, $995
- Floppy disks with A/UX system software, $995
- CD-ROM disc with A/UX system software, $795

Apple also offers A/UX 2.0 upgrades on CD-ROM discs, floppies, and tape for owners of version 1.0. Call for details.

A/UX manual sets

- Manual set #B0274LL/A, includes #M0429LL/A, #M0430LL/A, and #M0431LL/A, $800
- User kit (#M0429LL/A) for using A/UX with traditional UNIX commands, $275
- Programmer's kit (#M0430LL/A) for developing A/UX UNIX applications, $400
- Kit for system administrators (#M0431LL/A), $175
- X Window System manuals (#M0748LL/A), $195

Miscellaneous

- X Window System for A/UX, with manuals, $350
- A/UX Accessory Kit, includes manuals (*Installation, A/UX Essentials, Setting Up Accounts and Peripherals*, and *Road Map*), Release Notes, and five utility disks, $250

Licensing and Support: Also available are right-to-copy and right-to-update licenses for A/UX 2.0, a right-to-copy and site license for the (A/UX) X Window System, one-year support contracts for the A/UX Technical Answerline Service, and an annual software-update service.

Note: Apple is planning changes in its price list and available configurations.

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most Macintosh telecommunications programs will work just fine with A/UX.

If you work with a Mac in an environment full of UNIX machines, you probably use a Mac program such as TCP/Connect II (from InterCon) to log in to those machines or transfer files over the Ethernet network. You may also have a UNIX-to-Mac mail system set up. But with A/UX, life becomes much simpler. Your Mac stays on the network, but now it's a first-class UNIX citizen. You can use standard UNIX communications programs such as rlogin, TELNET, UNIX mail, or FTP (for file transfer) to talk to other UNIX machines. Better yet, you can read from and write to a networked UNIX machine's hard disks directly with NFS. Those hard disks are then visible to MultiFinder and Mac programs, as with an AppleShare volume. You can even set up your Mac to allow other UNIX machines to access your Mac hard disk.

Product Support

Apple's user support for the first version of A/UX was simply awful. Apple is now serious about A/UX, and every new purchase of A/UX 2.0 gets 30 days of unlimited toll-free, 5-days-a-week, 12-hours-a-day support from the A/UX Technical Answerline Service (which is now also much more helpful). Call it when all those A/UX manuals can't help you.

Apple doesn't provide direct support for third-party developers' products, other than by publishing the regularly updated A/UX-compatibility list. Apple already has a few software patches to correct minor problems that have appeared since the original release of A/UX 2.0. Also available are a wealth of technical information and many public-domain programs, such as emacs.

As a result of Apple's improved support, you'll find that fewer Mac-application vendors give you dumb looks when you talk about A/UX compatibility.

The Grass Is Always Greener

Although A/UX 2.0 is a monumental advance in the Mac operating system, it's not perfect. Along with better support for tape backup, we'd like to see some additional features. There are also a few minor bugs, but most won't affect normal use.

The CommandShell program lacks refinements found in many terminal-emulation-software packages. It offers no support for the extended keyboard, it can't archive sessions to disk, and it can't compress empty lines after they scroll off the screen. It's also not terribly smart about where it should create new windows.

The sendmail.cf file, which tells your Mac how to send mail to other machines via the serial port, is not configured to work correctly for UUCP (UNIX-to-UNIX Copy Protocol) remote connections. The UUCP software (a strange and unreliable old UNIX hack) is still seriously flawed.

Various A/UX default configurations could be improved; these affect security, shell run commands, and memory buffers. Apple should solicit a detailed, ongoing analysis of such default settings from its key A/UX sites.

The Mac supports a full 8-bit ASCII character set for filenames, whereas A/UX supports only 7-bit ASCII. This can cause real problems. For example, let's say that you install a Mac INIT that contains ™ in its filename and then A/UX consistently bombs after log-in. If you attempt to delete the offending file by entering `rm myfavoriteinitthatbombs™` in the UNIX Console dialog box, A/UX will interpret your keystroke combination Option-2 as an asterisk (*) instead of the ™ character.

A/UX doesn't yet support multiple monitors hooked up to a single CPU. This is especially inconvenient when it insists on using the wrong monitor. In this case, you must rearrange the video cards so that the correct one is in the lowest-numbered NuBus slot.

It Looks and Feels Like a Mac!

A/UX 2.0 is, on the whole, a superb combination of the Mac and UNIX System V 2.2 and 4.3BSD extensions. Unlike other flavors of UNIX, A/UX is easy to set up and it makes common configuration tasks as simple as they can get.

For real-world work, A/UX is the best system to offer both UNIX and a large base of productivity applications. It's an extraordinarily clean product, with few problems. In fact, A/UX is the most interesting and impressive software to have come out of Apple since HyperCard. A/UX 2.0 is not just great UNIX software — it's great Macintosh software.

Alexis Rosen, owner of Areté Corp. in New York City, is a Mac consultant who has been working with UNIX for seven years. Jeff Pittelkau is associate director of MacUser Labs.

The Bottom Line

If you have no need or desire for UNIX, you can forget about A/UX — it doesn't offer any major features not available in the Mac operating system and applications. On the other hand, if you have even a slight urge to run UNIX on a Mac (and you've got the hardware to support it), run out and buy A/UX today. For most users, it's a wonderful, virtually painless way to run UNIX on your desktop without giving up your favorite Mac software.

Just because you're buying A/UX, you don't have to buy all-Apple hardware. Try a careful selection of third-party disk drives, memory, and Ethernet cards, and you may get more performance for your money. Keep an eye on Apple's increasingly competitive pricing, though.

If you want UNIX connectivity but absolutely refuse to run UNIX on your local Mac, consider TCP/Connect II; it's an elegant and powerful program. Or you might prefer MacX or eXodus. But then think about A/UX 2.0 again. It's really that good.



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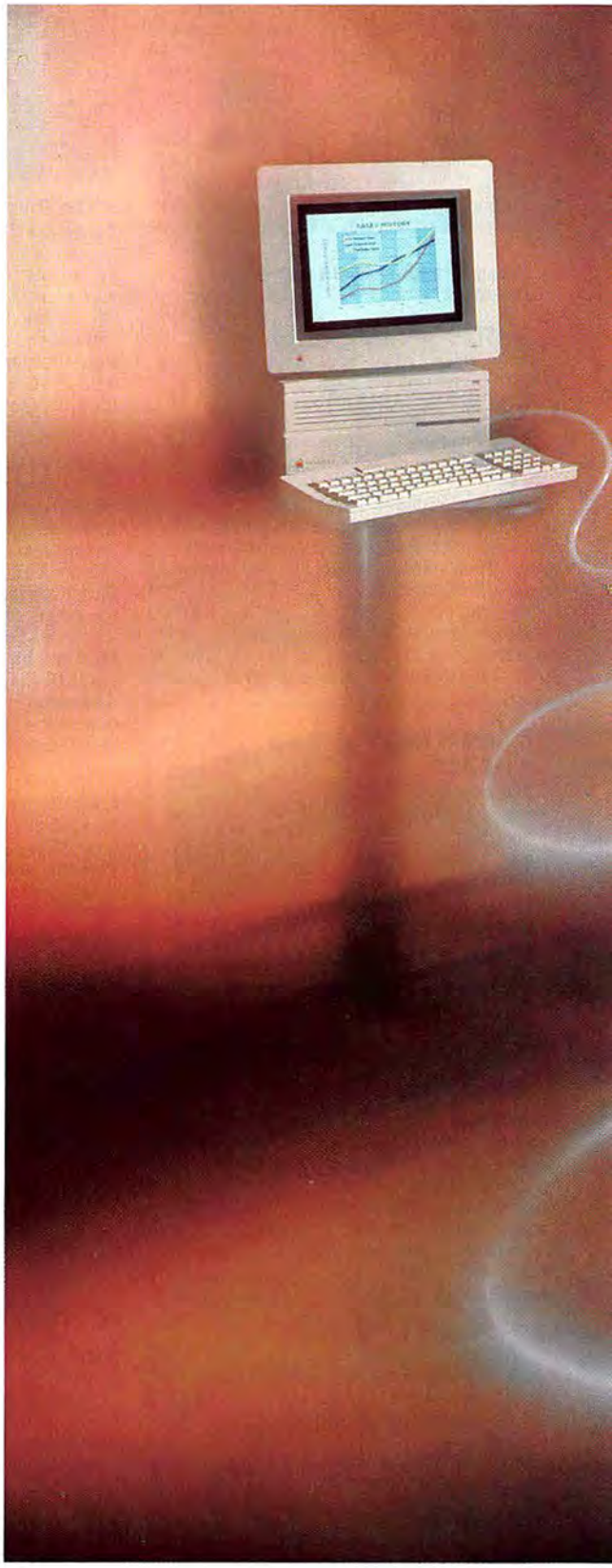
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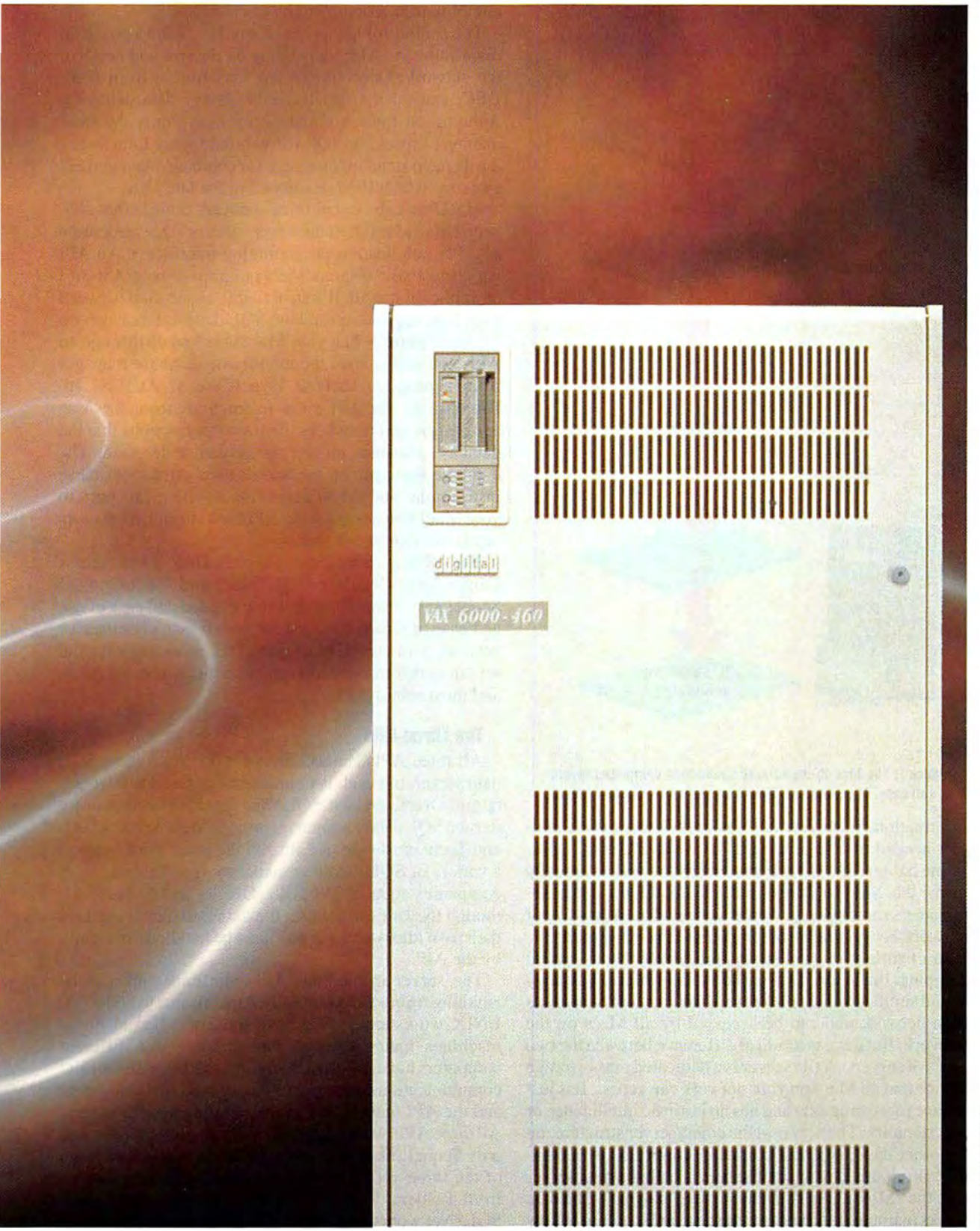
BY VERNON KEENAN, PAUL YI, AND THE MACUSER LABS STAFF



Your spreadsheet or database program can now help itself to data on your company's mainframe — MacUser Labs shows you how.

Imagine a database that holds all the data in the world. Such a mammoth store of information would require the most sophisticated hardware and software, tended by a protective swarm of MIS (management information system) professionals. But how would you use that database? If it were managed the same way most major databases are, you'd submit a formal request to the MIS department and then wait weeks for a report. Now imagine you could use your Mac to access this database yourself and transfer data directly into your spreadsheet, database, or HyperCard stack. All the data in the world would be just a mouse click away.

Such easy access to everything about everything is everyone's dream for the future. If your company's important data is currently held hostage in a carefully controlled central database, you'll already understand the attraction of quick, seamless personal access to crucial



PHOTOGRAPHY: TIM PACURA

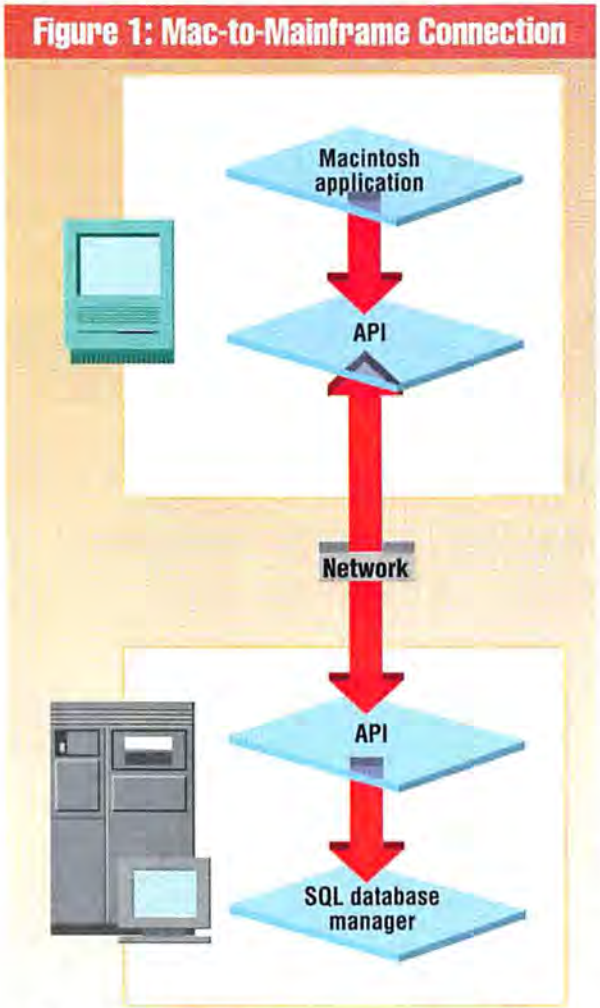


Figure 1: The Mac-to-mainframe connection comprises layers of software. The simplest client/server picture has four layers.

information. What you may not know is that the technology needed to bridge the gap between Mac and mainframe has arrived. In fact, many corporations are already using the Mac to access industrial-strength database-managers running on powerful servers. This next wave of network computing is called *client/server computing.*

In client/server computing, the server is the central computer that plays *host* to a network of Macs. This may sound similar to an AppleShare file server, which also sits on a network and can be accessed by all Macs on the network. But there is a radical difference between the two types of servers. A file server is a dedicated mass-storage device that all Macs on your network can access. It is just a place for storing data and has no intrinsic intelligence or functionality. The server in the client/server structure, on the other hand, is a host computer controlled by a database program. This type of server is called a data server (see the "Moving Up to Data Servers" sidebar). The data server maintains and updates the data and is able to follow complex instructions sent by client Macs.

The central computer can be anything from a powerful mainframe to a Mac, depending on the size and needs of the network. Corporations use mainframes from IBM, DEC, and other firms to handle heavy data demands. Running on these computers are heavy-duty database managers speaking SQL (Structured Query Language), the de facto standard language for database-management systems, which IBM developed in the late '70s.

MacUser Labs tested three software bridges that connect a Mac to a SQL data server; such bridges are known as APIs (application-programming interfaces). An API isn't a database or spreadsheet program — in fact, it isn't an application at all. It's an invisible connection between your Mac application and the SQL database manager on the mainframe. When your Mac is hooked up through an API, you can control the mainframe database manager from a program such as HyperCard or ACIUS' 4th Dimension. The API takes instructions from the Mac application and translates them into instructions that the database manager on the server can understand. The database manager on the server then carries out these instructions, and the API takes the resulting data back to your Mac. You never see the API itself; in fact, most users never even know it's there.

The APIs we tested were Apple's DAL (Data Access Language), Oracle's SQL*Net, and TechGnosis' SequeLink. We evaluated each for speed and ease of use and ease of setup. We constructed our own client/server network with several Macs and a DEC minicomputer and set out to determine which one was the fastest, simplest, and most robust API.

The Three APIs

All three APIs connect one or more Macs to an SQL data server, but each is unique in design and implementation. Oracle created SQL*Net specifically to connect its own SQL database managers to the Mac. Apple's DAL and TechGnosis' SequeLink, on the other hand, support a variety of SQL database managers (see Table 1) from companies such as INGRES, Oracle, and Sybase. Although they all speak SQL, the database managers have their own idiosyncrasies and must be handled differently by the API.

The server in the Mac-API-mainframe link can be anything from a $1,000,000 IBM mainframe to a $10,000 UNIX workstation. (We have loosely called all these machines mainframes in this article.) But different computers have different operating-system software and communications protocols (AppleTalk, for example), and the API must follow each operating system's rules. All three APIs work with DEC VAX minicomputers, and only SequeLink doesn't support IBM mainframes. None of the three yet supports other popular mainframes — from Tandem, Unisys, or MIPS, for example. Oracle's SQL*Net works on IBM's slow-to-be-adopted OS/2 PC

Figure 2: Client/Server Layers

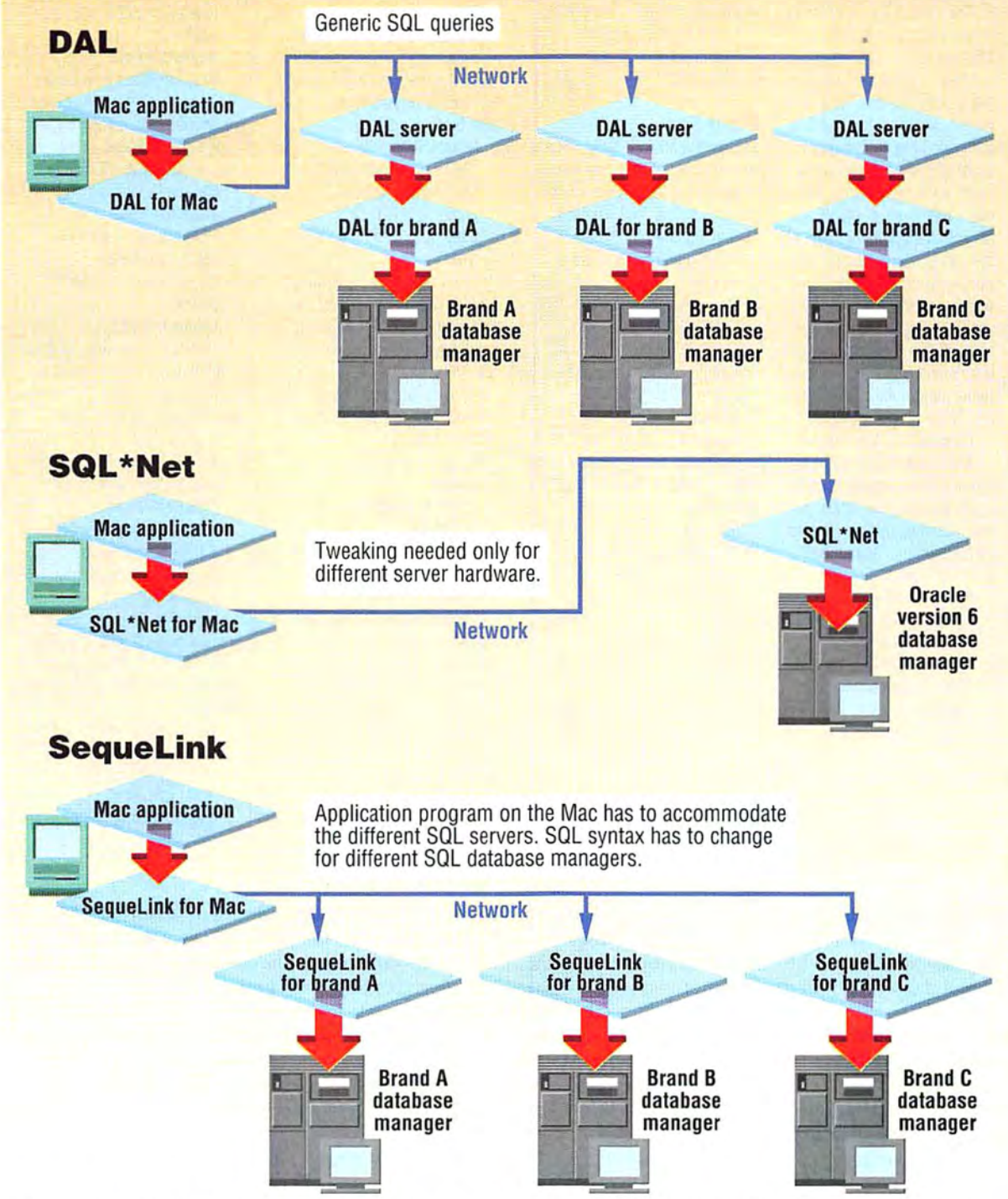


Figure 2: Apple's DAL differs from Oracle's SQL*Net and TechGnosis' SequeLink in that its server end has two layers: one generic and one specific to the brand of database manager running on the server. The *server-independent* architecture frees MIS staffs from the chore of programming the Mac layers differently for each different server — an important feature when different servers share the same network.

Client Products

The three APIs reviewed in this article can connect your Mac to a mainframe database, but they can't help you do anything with the data you find there. You need a full-featured database or spreadsheet program to analyze, chart, or print your data. Programs from companies such as ACIUS and Microsoft take advantage of the server connection by supporting APIs. Also, a new crop of programs is appearing — ranging from simple query builders to full system-administration programs — that make using the SQL data-server connection easier.

ClearAccess Version 1.1

This query tool provides a graphical interface for accessing SQL databases, with scripts that save and replay sequences of query actions. Supports DAL and SQL*Net.

Fairfield Software
200 W. Lowe
Fairfield, IA 52556
(515) 472-7077
$349; upgrades and unlimited tech support, $70; site licenses available

Data Access

Data Access is a macro that gives Microsoft Excel users direct access to SQL databases. Supports DAL.

Microsoft Corp.
1 Microsoft Way
Redmond, WA 98052
(206) 882-8080
$15

Data Prism

Data Prism is a powerful, easy-to-use query tool that also has charting capabilities built in. Supports DAL and SQL*Net.

Brio Technology
810 Mountain Bay Plaza
444 Castro Street
Mountain View, CA 94041
(800) 486-2746
(415) 961-4110
$435; volume discounts available

DataLink

DataLink is a query tool that gives Wingz users direct access to SQL databases. Supports DAL.

Informix Software, Inc.
16011 College Blvd.
Lenexa, KS 66219
(913) 599-7100
$19.95

4th Dimension 2.10

4D is a powerful relational-database program with a complete set of tools for accessing SQL databases. Supports DAL, SQL*Net, and SequeLink.

ACIUS
10351 Bubb Road
Cupertino, CA 95014
(408) 252-4444
$795

GeoQuery

GeoQuery is a query builder that helps visualize data, especially data related to geography. Supports DAL.

Odesta Corp.
4084 Commercial Avenue
Northbrook, IL 60062
(800) 334-6041
$395

GQL

In addition to being a query builder, GQL is a complete administrative system for SQL databases. Supports DAL and SQL*Net.

Andyne Computing Ltd.
544 Princess Street
Suite 202
Kingston, Ontario K7L 1C7
Canada
(800) 267-0665
GQL/Admin, $1,195
GQL/Design, $995
GQL/User, $295

Hyper/DB Library

Similar to Oracle's SQL*Net, this is Sybase's API for its own SQL database managers. (We invited Sybase to participate in this review, but the company refused to be involved in a comparison with Oracle's database managers.)

Sybase, Inc.
6475 Christie Avenue
Emeryville, CA 94608
(800) 879-2273
$195

Nexpert Object

Nexpert Object is an expert-system shell that helps you reason about data from a wide range of databases and files. Supports DAL and SQL*Net.

Neuron Data, Inc.
444 High Street
Palo Alto, CA 94301
(415) 321-4488
Development system, $5,000

Omnis 5 1.103

Omnis 5 is a comprehensive Mac database manager that provides direct access to SQL databases. Supports DAL.

Blyth Software
1065 E. Hillsdale Blvd., #300
Foster City, CA 94404
(800) 843-8615
(800) 223-8050 (in CA)
Single-user version, $1,000; each additional user, $99

Tactician

Tactician is a marketing-productivity tool with a geographic interface. Supports DAL.

Tactics International Ltd.
16 Haverhill Street
Andover, MA 01810
(508) 475-4475
$995 – $9,995, depending on configuration

operating system, and both SQL*Net and SequeLink are compatible with some implementations of UNIX.

Because the API provides the connection between the Mac and the server, it must consist of two parts — one piece of software that runs on the Mac and another that runs on the server. The simplest client/server scenario involves four software layers. The first is your Mac's database or spreadsheet program — for example, Microsoft Excel. The Mac-based API is the second layer. The third layer is the mainframe API, which handles the data traffic from multiple Mac clients and speaks to the fourth and final layer, the server's SQL database manager (see Figure 1).

Over the past year or so, you may have heard that Apple was planning to offer a mainframe-connection product called CL/1. It hasn't disappeared — it's been renamed DAL. The Mac layer will be part of System 7.0 and will be free with every new Mac. You'll still need DAL's Client Developer Toolkit ($695) to get the programming tools necessary to make the connection — and, of course, you'll need to buy the mainframe layer.

DAL connects to most of the current crop of database managers running on DEC VAXes and IBM mainframes (see Table 1). The price of the DAL layer on the server is $5,000 to $20,000, depending on the mainframe. You can also expect DAL support for UNIX and A/UX sometime in the near future.

TechGnosis' SequeLink supports a multitude of SQL database managers and computer platforms. SequeLink for the Mac sells for $695 per user, with volume discounts; the server end costs $4,995.

Oracle is one of the leading database-management-software companies, and it created SQL*Net to connect the Mac to its own database managers — and *only* its own



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Tell AE Send-Fax™ to send your faxes and lengthy distribution lists late at night, when phone rates are least expensive and you're least likely to encounter busy signals. The next day, you'll be presented with a report confirming your faxes were received. You can even preset the number of retries for individual numbers, for distribution lists or for the entire phonebook.

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DataLink/Mac™ (top) for the Mac II series, includes an extra serial port so you can add a peripheral, even when the built-in ports are occupied. **DataLink Express™** (left center) works externally with all Macintoshes and features another AE exclusive, our "Line Engaged" indicator to show a shared line is in use. Since DataLink Express works with all computers (w/serial port), we included both mini-8 and DB-25 ports. **DataLink/Mac Portable™** (bottom) includes AE Send-Fax™ and MNP-5 as standard features and incorporates an ultra-low power design to extend the Mac Portable's battery life.

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Figure 3: *MacUser*'s Own Client/Server Network

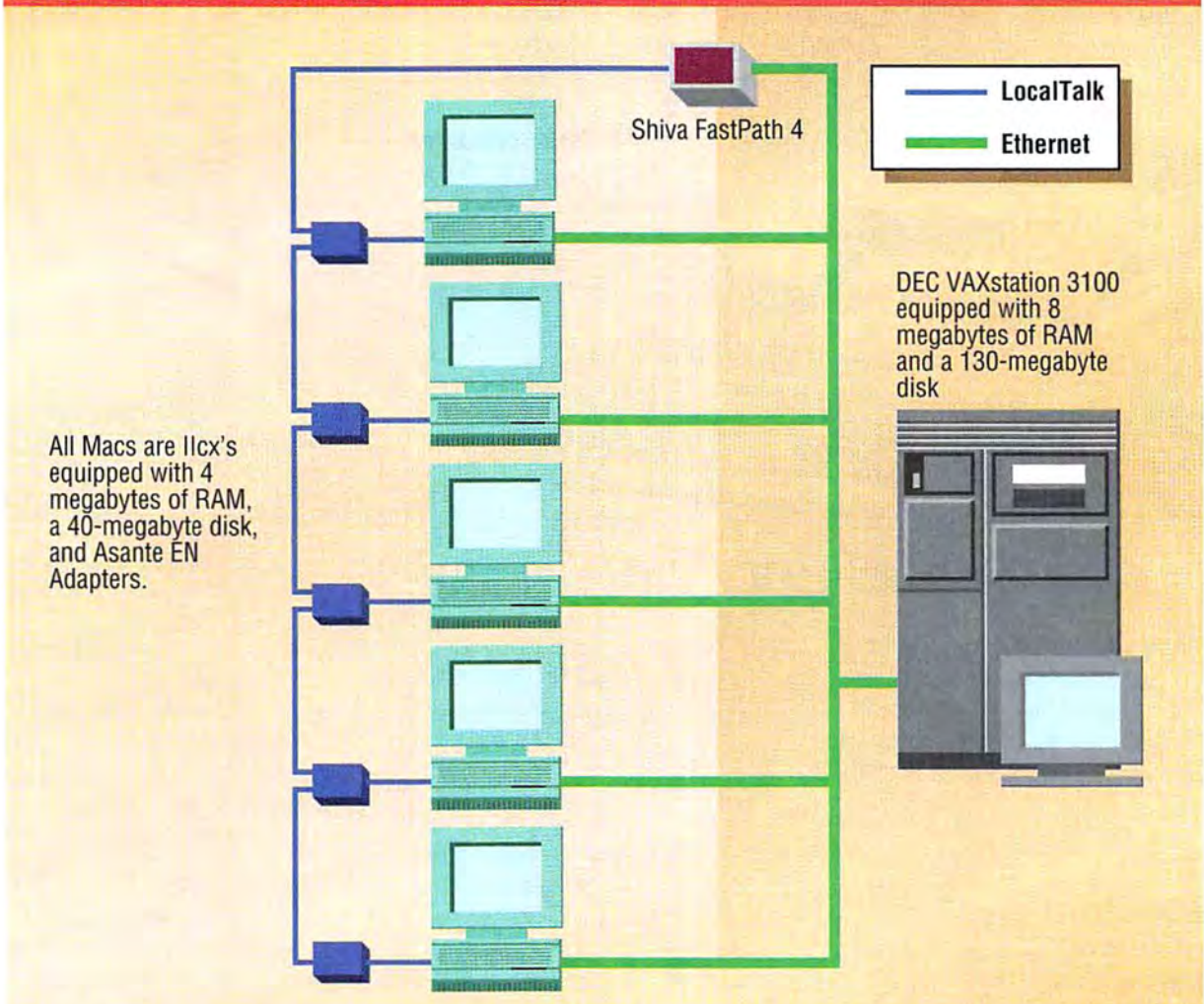


Figure 3: We set up this client/server network in our NetWorkShop to test the APIs. A DEC VAXstation 3100 was our server. Five Mac IIcx's were connected to the VAX with both LocalTalk and Ethernet. The API installation on the Mac was relatively easy, but the VAX installation was more trying — especially for SequeLink. Once it was running, however, the network gave us no trouble.

database managers — running on a variety of computer platforms.

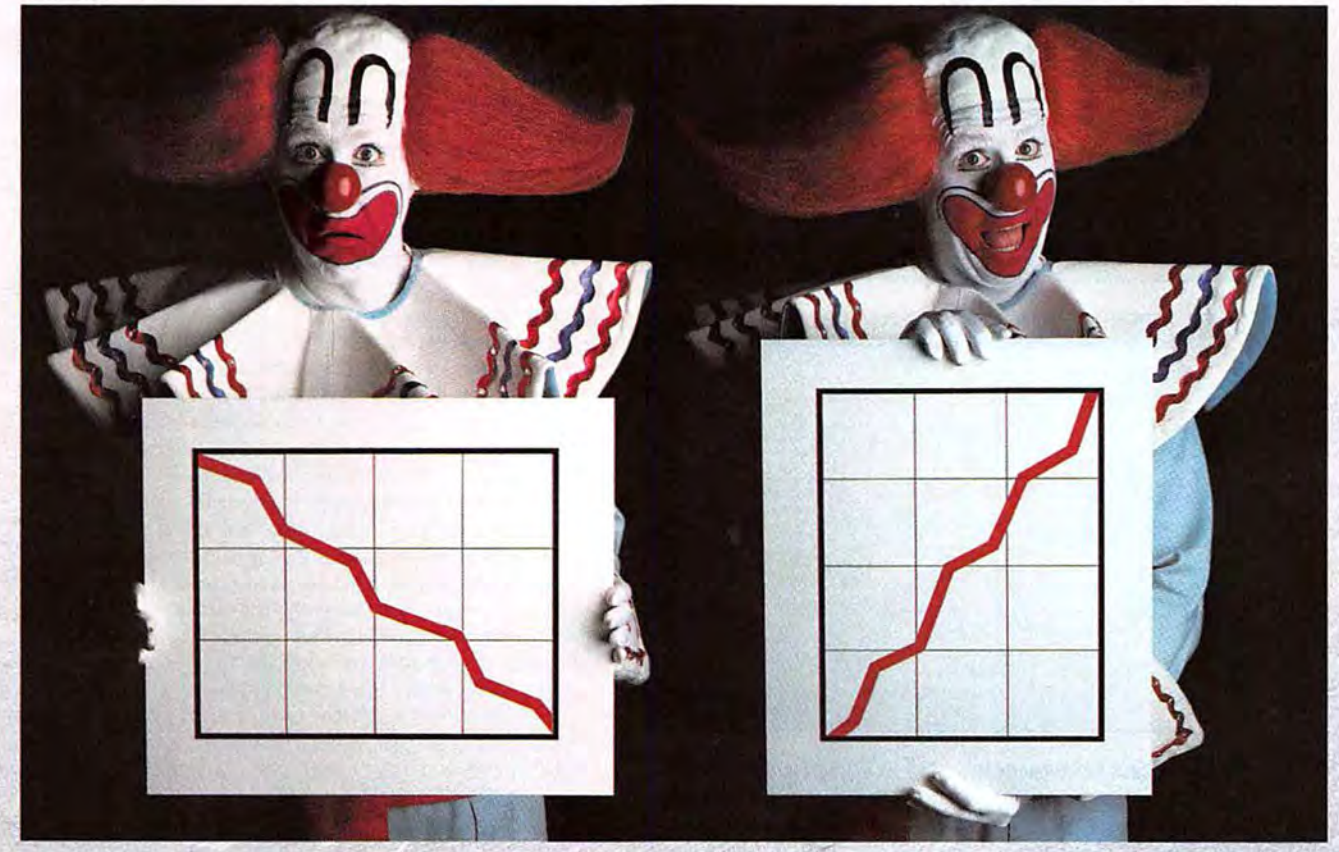
The Layers of the Client/Server

The Mac layer of each API is similar in form and function, but Apple's DAL uses a *server-independent* architecture on the mainframe that frees your MIS staff from the chore of programming the Mac layers differently for each different server. DAL accomplishes this by adding an additional layer, a *generic* layer, to the server (see Figure 2). The generic layer doesn't know the particulars of the computer or the database manager it's running. The second mainframe layer, however, the *specific* layer, is exclusive to the brand of database manager and mainframe used. For a server running a Sybase database manager, for example, the generic layer runs on top of a Sybase-specific layer. For a server running INGRES, the *same* generic layer runs on top of an INGRES-specific layer.

The advantage of this architecture is that DAL's Mac layer doesn't need to know what SQL data server is being used. For networks with mixed database managers and servers, no extra work on the Mac end is required. If your DAL-equipped Mac can talk to one DAL server, it can talk to any DAL server.

SequeLink uses a single-layer server architecture, so you need a different version of SequeLink for each type of database manager or mainframe. And because the Mac layer of SequeLink must then talk to different versions of SequeLink on the server end, you also need to reprogram

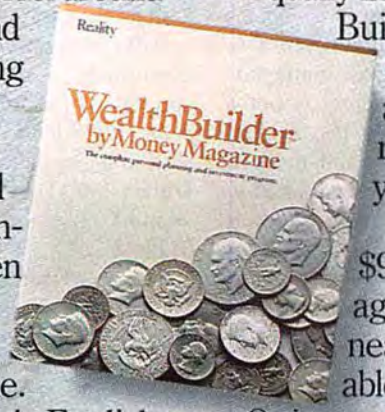
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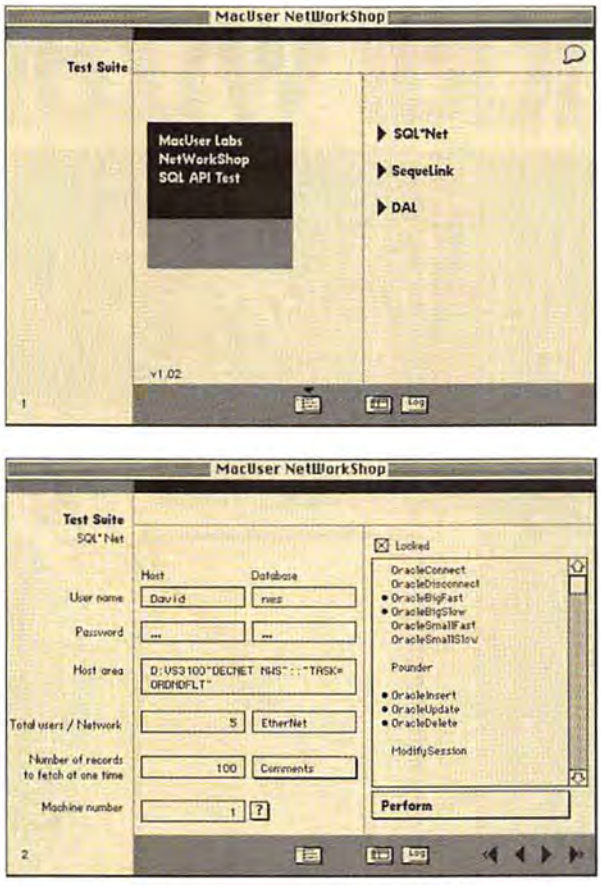


Figure 4: Each API supports HyperTalk as a programming environment, so we wrote a HyperCard stack to automatically test API performance. This stack is a good example of how you can create a custom interface to access the data server through a Mac application.

Moving Up to Data Servers

When you started your business, you had computing needs. You bought a few Macs, and — for a while — they more than filled the bill. But your business has grown over the years, and you've increased the number of Macs in the company and added a few AppleShare file servers. Now you're realizing that you have to deal with a large amount of data and that the file servers are not fulfilling your needs. You need a powerful central database system. You need a client/server solution.

What's Wrong with File Servers?

First of all, don't let the prospect of wrestling with a mainframe or minicomputer scare you away from a client/server solution. Client/server technology is rapidly spreading to desktop computers that formerly were limited to file-server technology. Any networked Mac database system you have now, whether it's an accounting system or a sales-lead-tracking application, is using file-server technology. You're probably not happy with network performance, and if you are, you'll be even happier with client/server performance.

Conventional file-server technology is very inefficient for large-database use, because the file server doesn't know anything about the data. For example, say a database on the file server contains a list of names. When you ask your Mac database program to find everyone whose last name is Smith, the command your Mac sends to the server is something like "Give me the name of everyone in the database so I can decide which ones are Smiths." If your database contains the names of 100,000 people, this moves an awful lot of data across the network — a slow process when only one user needs data and much slower on a heavily loaded network. Access time and performance also depend on the power of the machine on your desk, so you need expensive Mac models to optimize performance.

With client/server technology, you add a new computer to act as the data server on your network. In conjunction with an API, its database software is smart enough to answer specific requests, look up the data itself, and send back only the results. The command your Mac sends to a data server through an API looks like this: "Figure out which people are Smiths, and send just the Smiths back to me." The more powerful tool than the "dumb" character-based terminals that were used before personal computers invaded the corporate world.

your HyperCard, 4th Dimension, or other Mac program used to access SequeLink. This means more work — and more expense — for your MIS department.

SQL*Net also has a one-layer server architecture — but SQL*Net works only with Oracle database managers, so support for different brands of managers is not a problem. Because SQL*Net is available in different versions for different *mainframe* makes and models, however, the SQL*Net Mac layer must be tweaked to work with the specific SQL*Net server layer — not as much work as is needed for SequeLink but still a job for the MIS folks.

Query Helpers

Although APIs solve the problem of Mac-to-mainframe connection, you still need a way to use the data you get from the server. Programs such as Microsoft Excel, HyperCard, and 4th Dimension are available with API links to help you analyze, sort, and chart this data. Such sophisticated *front-end* programs make the Mac a far

APIs also let you — or your ever-cooperative MIS department — program custom interfaces through their support of different languages, or *programming environments*. All the APIs support HyperTalk, HyperCard's scripting language; SQL*Net and SequeLink support 4th Dimension (DAL will soon); and DAL and SQL*Net support various implementations of C and Pascal (see Table 1).

These environments let you set up sets of *queries* — commands such as Search, Delete, and Update — that are part of the SQL language. For example, you can write a HyperCard stack with buttons that can issue these queries or a custom 4D procedure that can seamlessly access a corporate database. You can even write entire programs for DAL that can not only query a database on the server but can also act as a database manager on the client Mac.

If programming isn't your strong point, there's good

difference in performance can be stunning. Note that most of the everyday actions you would perform on a database — add, change, and delete data — took less than two seconds in our data-server API tests, even with a very heavy load. The same tests run on a file-server database show response times in minutes.

The architecture of a data server provides several other benefits. Remote access over telephone lines, prohibitively time-consuming with a file-server database, is quite practical with a data server. It's no problem to mix PCs and Macs as clients, because the server doesn't care what kind of computer it's talking with. And you can get good performance with low-end Macs and LocalTalk networks, because the server is doing the heavy data crunching.

Just as a file server is a computer running file-server software, a data server is a computer running a database-management program along with the appropriate software layers to let Macs talk to it. In our tests, for example, the computer was a desktop VAXstation 3100, the database manager was Oracle, and the connection layers were the three APIs.

To give you the real benefits of data-server performance, the server must be running a truly multiuser operating system, such as UNIX or VAX's VMS, on a machine such as a DEC VAX, a Sun workstation, or an 80386- or 80486-based computer. It's unfortunately not practical to use a conventional Mac as a high-volume data server, because neither System 6.x nor System 7.0 has the necessary memory-management or multiuser features. But a Mac IIfx running A/UX — Apple's UNIX operating system — is a powerful UNIX computer on a par with Sun UNIX machines. The Oracle and Informix database managers (and a test version of SequeLink) already run under A/UX, and time will bring even more options.

Problems

Client/server computing will be the next wave of network computing, but there are some hurdles. The first is that client/server technology on the Mac needs to be easier to use — right now it's a job for MIS professionals, not average users.

We reviewed three APIs — DAL, SequeLink, and SQL*Net — which let you access data from a data server. But you — or your MIS department — first have to set up the API on both the Mac and the server. The APIs provide programming environments in which custom applications can be written, but developing an application with these products is no simple task. The programmer needs a good knowledge of SQL — the standard language for industrial-strength database programs — and HyperCard scripting, 4th Dimension-procedure writing, C, or Pascal. Other programs are available that can help you use APIs, but without easier user tools, client/server technology is a throwback to the old days when central MIS departments controlled all data and programming. If moving from file servers to data servers means you'll need a full-time and well-staffed MIS department, client/server computing is a set of problems masquerading as a solution.

By contrast, there are programs on the DOS side of the desktop-computer revolution that provide easy client/server solutions. Programs such as DataEase — similar to FileMaker and Double Helix on the Mac — manage server data, using the same functions as they use on local data. There's nothing as easy on the Mac — yet. With time and more user acceptance of client/server technology on the Mac, this situation will hopefully improve.

Who Needs a Minicomputer?

Computerizing a 40-user business five years ago would have required a $200,000 minicomputer. But today minis are becoming less expensive and easier to use. Client/server technology ideally merges the best of two worlds: all the ease of use of personal computers and the data-processing horsepower of a central minicomputer — or for the truly power hungry, a mainframe. And the minicomputer can be a much smaller, cheaper machine than you would have needed five years ago, because all it does is crunch data while the Macs take care of handling the user interface. With client/server technology, businesses today are experiencing better database performance with 40 users on a $30,000 data server than they used to with $200,000 worth of minicomputers.

— David Beaver

news. A growing number of query builders are available (see the "Client Products" sidebar) that can build complex queries with simple mouse clicks. These programs run between a front-end program such as Excel and an API by translating Excel's instructions into the language used by the API. The API in turn translates the instructions into SQL commands for the server database manager.

Installation

Although everyone can take advantage of client/server technology, one aspect of this new wave — installation — will be enjoyed only by a minority. This is where MIS people earn their pay. We evaluated API installation in the MacUser Labs NetWorkShop, using a network of five Mac IIcx's connected to a DEC VAXstation 3100 with 8 megabytes of RAM — a midrange VAX workstation in both power and size (see Figure 3). Even though we used a VAX, our conclusions extend to general installation of the APIs.

On the Mac end, installation is as easy as dragging the API icons into the System Folder of each client Mac that will be accessing the host, along with other system resources that need to be installed to support the different physical connections and protocols. We especially appreciated the ease of installation on the Mac after we began the chore of installing the various subsections of the APIs onto the VAX.

A good manual is essential when you're tackling such a Herculean task. TechGnosis' SequeLink has one of the worst we've ever seen. It is poorly written and badly organized — almost indecipherable. Both Apple and Oracle provide much better documentation. DAL's gets the nod on the server side, whereas SQL*Net's is exemplary on the Mac side.

The Tests and the Results

After we had set up our network, we developed a set of tests to see which API was the fastest and which would make you pull your hair in frustration. We first created a simple 5,000-record Oracle SQL database and installed it

Figure 5: API Speed

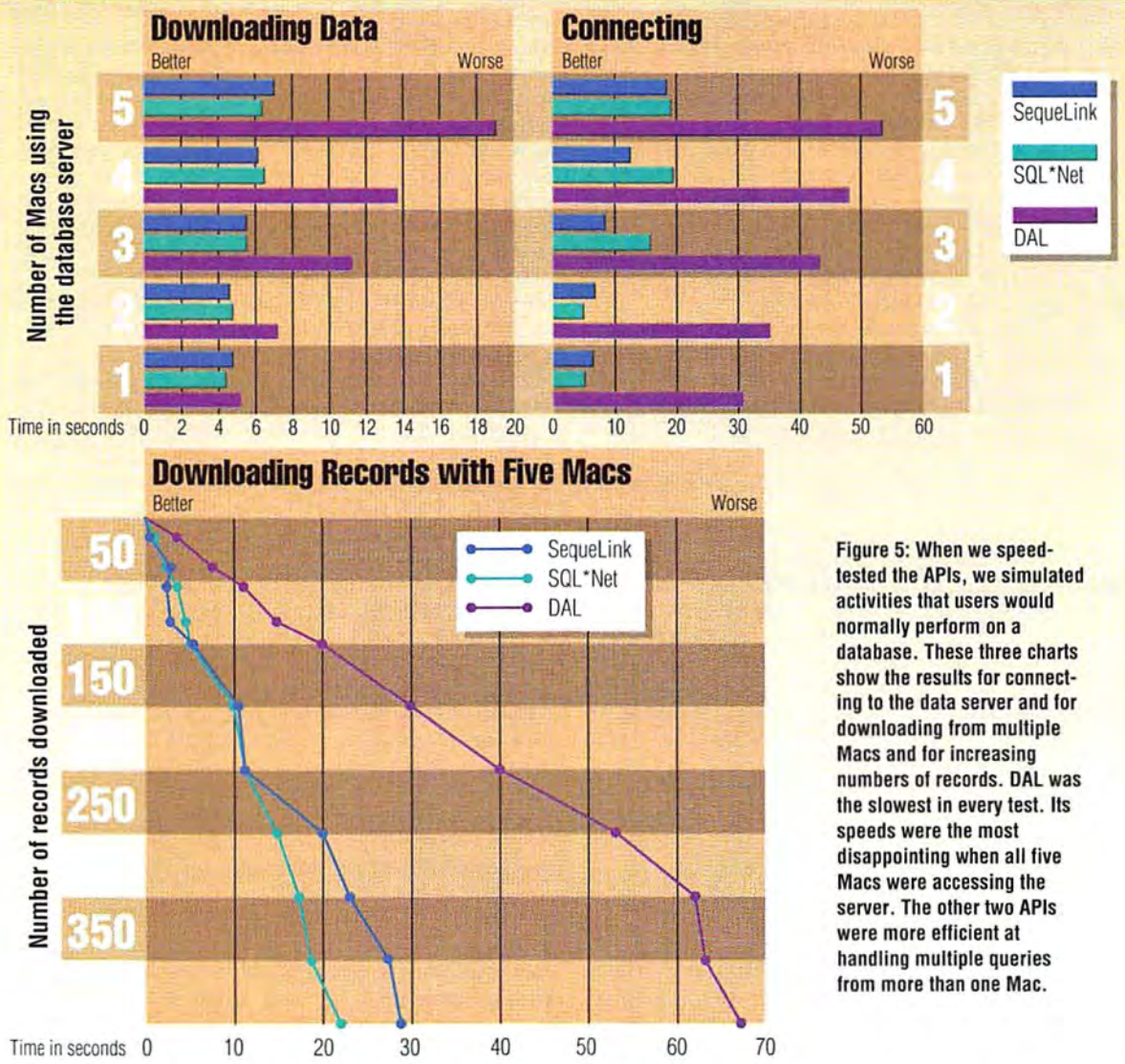


Figure 5: When we speed-tested the APIs, we simulated activities that users would normally perform on a database. These three charts show the results for connecting to the data server and for downloading from multiple Macs and for increasing numbers of records. DAL was the slowest in every test. Its speeds were the most disappointing when all five Macs were accessing the server. The other two APIs were more efficient at handling multiple queries from more than one Mac.

on our VAX. To test the Mac end, we wrote a custom HyperCard stack that managed and ran all the tests and automatically recorded the results — a good example of a custom interface that can be created for APIs (see Figure 4). We also tested access over both Ethernet and LocalTalk to see if the higher throughput of Ethernet would improve download times.

We created tests that simulated actions users typically perform with a database: downloading a lot of data, finding a single record, updating a single record, and inserting a single record. We then programmed the HyperCard stack to pound the server by running the tests as fast as it could, one query after another. We launched the HyperCard test stack on an increasing number of Macs until all five IIcx's were simultaneously pounding the server. Normal users wouldn't be as rough on the server as our HyperCard test stack was, because humans would take a break between queries to read the data. We estimate that pounding the server with our test stack running on 5 Macs is roughly equivalent to the effect real users would have with 20 Macs.

Although the client/server setup with all three APIs improves performance over file-server levels, DAL is consistently the slowest (see Figure 5). When only a single Mac is accessing the server, the results are close, but adding even one more Mac to the server makes DAL's performance degrade significantly. The more Macs accessing the data server and the more data being retrieved, the worse DAL's performance became. With all five Macs trying to access the server to retrieve 400 records,

DAL took nearly 70 seconds to perform the query whereas SQL*Net took only about 20 seconds and SequeLink took 30 seconds.

Because of its two-layer architecture, which gives it server independence, DAL consumes more of the VAX's CPU resources than do the other two APIs. SequeLink and SQL*Net show similar times because they have similar architectures. Using DAL, the VAXstation 3100 was swamped by only three Macs simultaneously accessing the server. With SQL*Net and SequeLink, however, the VAX still had processing room to spare with all five Macs pounding away. If you use a faster computer or one with more memory as a server, performance should improve — but you're also more likely to have more users. Unless you do all your work on Sunday morning, expect to pace the room a bit if you use DAL.

DAL's two-layer architecture causes another major performance problem: DAL is slow making the connection to the server. Even for a single user, DAL took more than 30 seconds to make the connection to the VAX, compared with about 5 seconds for SQL*Net and 6 seconds for SequeLink. Taking such a long time simply to initiate a server connection and then taking even longer to transfer data could be a major hurdle in trying to gain user acceptance of DAL-based applications. Apple promises an upgraded DAL "real soon now" that will address its performance problems.

Besides DAL's unexpectedly slow performance, another test result that surprised us was that direct Ethernet connection did not substantially improve the speed of any of the APIs. Even when we thought we would see the greatest difference between Ethernet and LocalTalk performance — downloading a large amount of data to all five Macs via DAL — Ethernet showed only a 15-percent speed advantage over LocalTalk. There was no difference in download time when we had only a single user on the network, which was surprising because Ethernet can carry up to 40 times as much data as LocalTalk can. Unless you're downloading large color images from the server, you probably won't need the higher cost— at least $400 per Mac — of a faster physical network. The bottleneck is not the physical cables and protocols but the server and how efficiently the APIs use it.

Conclusions

All three APIs worked as advertised: We can confidently say that client/server technology is alive and well on the Mac. Although only a handful of applications presently take full advantage of API power, more should appear in the near future.

When choosing the right API for your network — or when advising your MIS department as it chooses — remember that SQL*Net and SequeLink have a similar architecture that provides similar performance. DAL, on the other hand, has a radical architecture that greatly impairs performance but that makes using and setting it up much easier when more than one server is installed on a network. DAL also provides powerful programming tools for writing custom interfaces. But the price of this platform independence and programming muscle is a severe performance penalty.

Vernon Keenan is a client/server expert who moonlights as an author. Paul Yi is a *MacUser* associate editor.

The Bottom Line

If you want your Mac to have access to the vast amount of data stored in your company's central database and if you want your company's mainframe to handle the bulk of the effort needed to find that data, you're in luck — all three of the APIs we tested do the job flawlessly. Although Apple's **DAL** turned in significantly slower times than did Oracle's **SQL*Net** and TechGnosis' **SequeLink**, there's more than speed to consider. Your final buying decision still depends on the particular Mac network and SQL data server you're using.

If you already have a server running an Oracle database manager, SQL*Net is the obvious choice. For some of the tests, SequeLink was faster, but SQL*Net's ease of use and simple programming make it the better choice — the advantages are more than worth the slight performance penalty. If you need a direct connection to a single non-Oracle database-management system, SequeLink — the fastest API — will do the trick. It's harder to use and set up, but its bottom line is top performance and your MIS department should be able to handle the extra effort.

If you need to access a variety of data servers, then Apple DAL gets the nod. It may be slower than the other two APIs, but in a mixed environment, its server-independent architecture provides convenience and cost savings that win out over performance.



All three APIs come with a daunting collection of documentation. Oracle's SQL*Net (right) has clear installation instructions, while the documentation for TechGnosis' SequeLink is sketchy. Apple's DAL package wasn't ready in time for our photo.

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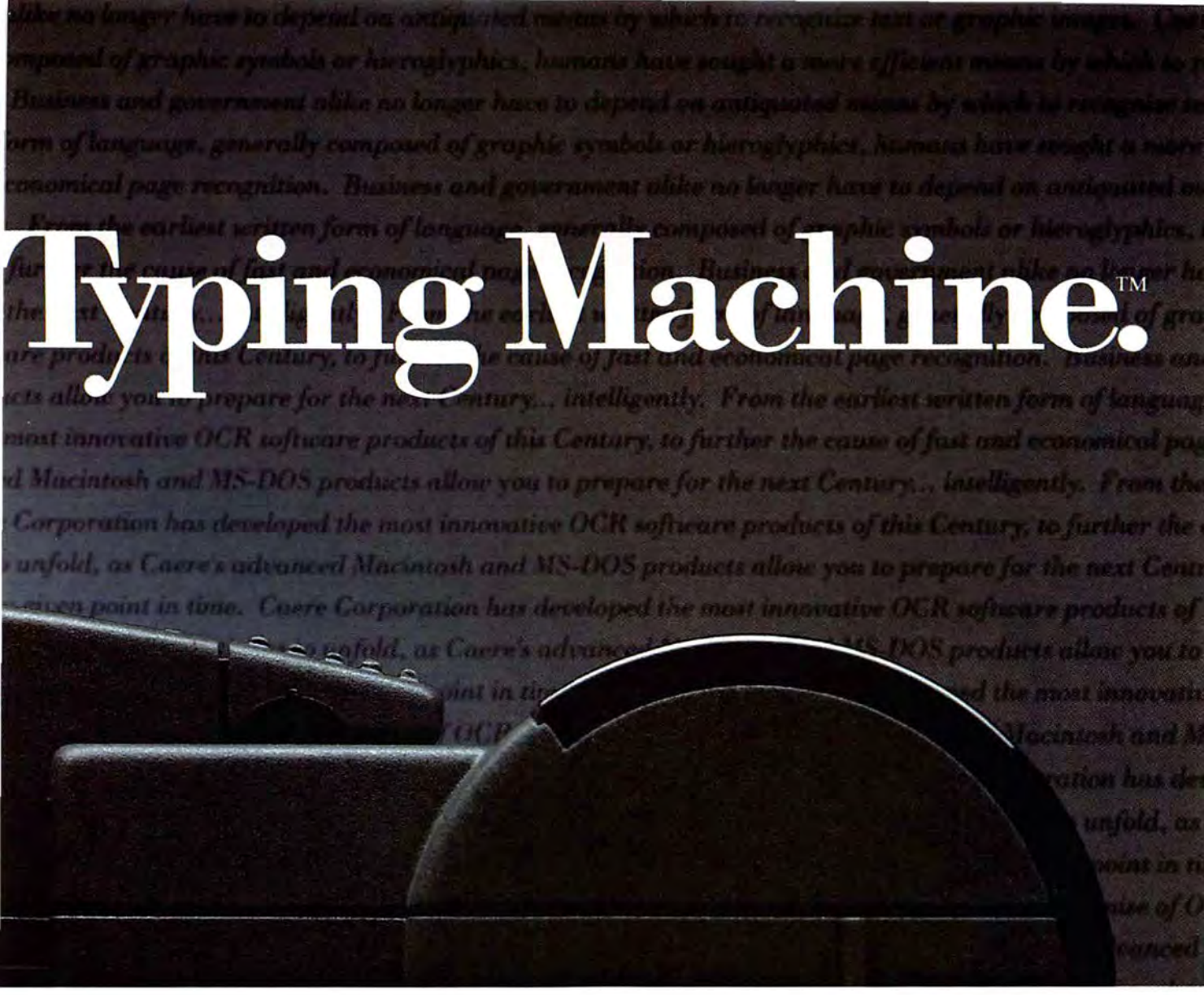
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Please circle 42 on reader service card.

Table 1: Features of APIs

● = yes ○ = no	Apple DAL (Data Access Language) $$$$	Oracle SQL*Net $$$$½	TechGnosis SequeLink $$$$
Prices for Mac	Free with System 7.0; Client Developer Toolkit, $695	$299 per user; Oracle for Macintosh, $699 (database version)	$695 per user, with volume discounts
Prices for server	VAX/VMS Server, $5,000 IBM VM Server, $15,000 IBM MVS Server, $20,000	VAXstation, $920 – $1,950 VMS, $4,600 – $13,000, depending on number of users	$4,995
Comments	Part of System 7.0. Offers server-independence. Slowest.	Oracle's API for Oracle database managers. Easy to use. Fast.	Faster alternative to DAL. Hard to use.
Server operating systems			
IBM MVS and VM	●	●	○
VAX/VMS	●	●	●
Other	○	UNIX, OS/2*	SCO UNIX/XENIX†
Database-management systems			
DB2	●	§	○
INGRES	●	○	●
Oracle	●	●	●
Rdb/VMS	●	○	●
SQL/DS	●	§	○
Sybase	●	○	●
Other	IBM MVS and VM, Informix	RMA§	Interbase
Networking protocols			
3270 emulation	●	●	○
AppleTalk ADSP	●	○	●
Asynchronous	●	●	○
DECnet	○	●	●
MacIRMA	◊	●	○
Netway 1000/2000	◊	●	○
Other	Avatar MacMainframe◊	TCP/IP	○
Client operating systems			
Macintosh	●	●	●
MS-DOS	○	●	○
OS/2	○	●	●
Other	○	UNIX, IBM MVS and VS, VAX/VMS	Windows 3.0
Programming environments			
HyperCard	●	●	●
4th Dimension	**	●	●
Other	MPW C, THINK Pascal, THINK C	Aztec, MPW C, THINK C	○
	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (800) 282-2732	Oracle Corp. 500 Oracle Pkwy. Redwood Shores, CA 94065 (800) 345-3267	TechGnosis, Inc. One Park Place, Suite 340 621 N.W. 53rd St. Boca Raton, FL 33487 (800) 275-7565 (407) 997-6687

*SQL*Net works with any operating system that supports DECnet, TCP/IP, or 3270 emulation protocols.

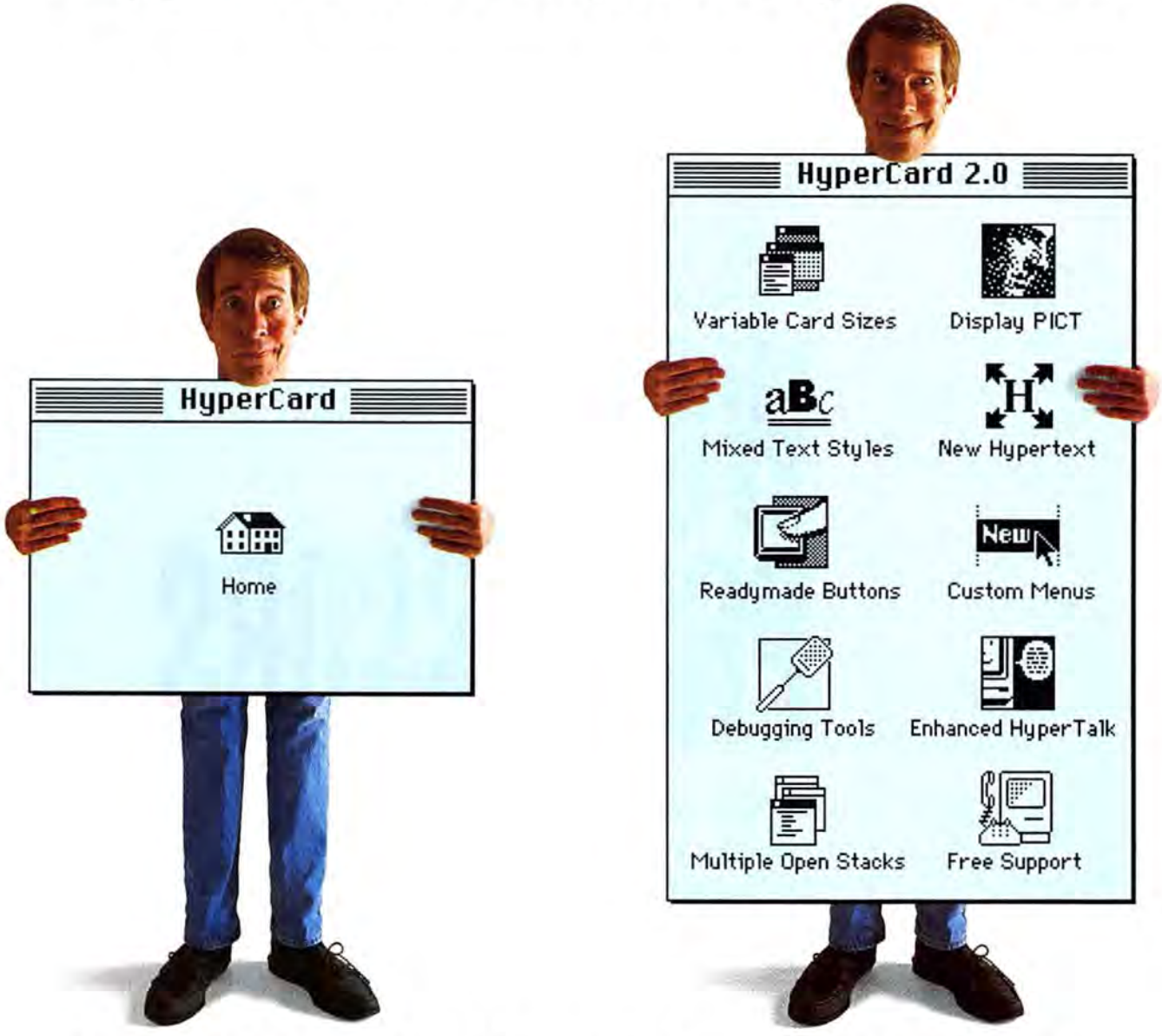
†This was scheduled to ship in the fourth quarter of 1990.

§Supported via SQL*Connect gateway

◊You also need a LocalTalk/SNA gateway from the manufacturers of these protocols.

**4th Dimension support was supposed to be available in the third quarter of 1990.

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BEST-BUY BARGAIN

WORD PROCESSORS

Saving money is always a good idea — especially when you can still get all the word power you need.

BY CHARLES SPEZZANO, KELLI WISETH, AND THE MACUSER LABS STAFF

You don't need a Rolls to drive to the laundromat. Such reasoning — and the Mac's premium price — has convinced many would-be Mac owners to remain would-be Mac owners. Unable to justify a Mac for modest needs, they've settled for — what? — maybe a PC clone, maybe a Kaypro? But with the arrival of the new low-cost Macs, anyone can join the Apple family without mortgaging the family farm.

The new Mac Classic and LC are truly the computers the rest of us can afford. After you've plugged yours in, one of the first things you might want to do is use it to send a thank-you note to Cupertino. You'll need word-processing software to write that note, though, and the price of the more powerful programs could bring the Rolls analogy to mind again. Who wants to buy a word processor that costs about half as much as a new low-cost Mac?

PHOTOGRAPHY: CHARLES CHAT


Dear MacUser,
I know there are lots of powerful word processors to choose from, but
I'm looking for something easier to use and less expensive. How do MacWrite II, Microsoft Works, WordMaker, and WriteNow measure up?
Macintosh Plus

Cost is not the only consideration. Sophisticated word-processing packages that provide some of the capabilities of traditional publishing systems — outlining, indexing, and table-of-contents generation, for example (see the "What You Won't Get in the Bargain" sidebar) — will make you climb a steep learning curve long after you've finished huffing and puffing over the high price tag. And a 1- or 2-megabyte Mac may not have enough power for the climb. Herein lies the mission of the bargain word processor: to provide the features you need to create less complex or shorter documents without the cost-and-complication overhead that comes with a higher-priced package.

MacUser Labs looked at four of the best bargain word processors on the market today: Claris MacWrite II, Microsoft Works 2.00, New Horizons WordMaker 1.01, and T/Maker WriteNow 2.2. Three of these are dedicated word processors, but Microsoft Works is an integrated package of programs with many other features (see the "Bundled Bargains" sidebar). Rather than being dismissed as entry-level or categorized as low-end, these word processors should instead be thought of simply as low-cost. For many users, they offer as many features as they will ever need. If you don't need complex page-layout or document-organizing capabilities, don't pay for them (see the "Shareware Word Processors" sidebar).

In evaluating any word processor, you need to look beyond the results of benchmark tests. The way a word processor looks and feels, how well your hardware can handle it, and whether it can do what you want it to are probably going to be more important to you than anything else.

Bargain-Basement Word Processing

At its simplest, word processing on the Mac involves two steps: editing (getting the right words in the right order) and formatting (giving the document the look you want it to have when it is printed). A great word processor lets you edit with speed and efficiency and format with power and flexibility. It doesn't just have a lot of features — it has useful features that work well.

Whether you're writing a 1-page memo or a 100-page proposal, some features are essential in a word processor (see Figure 1). For example, you need the ability to assemble and reassemble your document at will, search for and replace text, and globally change font characteristics. And all these features have to work swiftly and consistently. Before we evaluated each word processor's editing and formatting power, we examined how well the program handled the most essential feature of all: the ability to let you change your mind.

Undo. Did you just delete an entire paragraph by mistake? The Undo command can, for the most part, put it right back in. We say "for the most part" because each of these programs has different levels of undo-ability. WriteNow can undo virtually anything you've done, even a global search and replace — an invaluable feature when you've just made a disastrous global error — but something MacWrite II and WordMaker can't. WriteNow's Undo command can also

What You Won't Get in the Bargain

What if you're writing the Great American Novel? Or — even more of a challenge — the Great American Quarterly Sales Report and Earnings Forecast? Although the four word processors we tested pack a lot of punch, you might want some features found in higher-priced packages — outlining, complete style-sheet support, and automatic indexing and table-of-contents generation, for example.

The most popular Macintosh word processor is Microsoft Word — by a long shot. Don't think, however, that Microsoft has a lock on the features market: Vendors such as Ashton-Tate and Paragon Concepts are snapping at Microsoft's heels with FullWrite Professional and Nisus, respectively.

Outlining is a habit that many people had foisted on them by strict high school English teachers. You can create an outline in any word processor, but reorganizing an outline is tedious without software support. High-end word processors all have outlining capabilities that make this reorganization easy. For example, when you move a top-level heading, all the subordinate headings — and their accompanying text — automatically move with it. You can instruct the word processor to show just high-level headings so that you can see "the big picture" and then hone in on particular areas by showing the lower-level headings within.

Another important feature you'll want if you typically write longer documents is a style sheet. A style sheet is a description of the formatting you want to use for the many parts of your document. For instance, you can specify one format (Helvetica 12, justified) for regular paragraphs, a different one (Palatino 24, bold, centered, two blank lines after) for chapter titles, and so on. If you later change your mind about what kind of formatting you want, you need change only the style in the style sheet: The program automatically changes the formatting for every paragraph that uses that style. Imagine how much time this approach can save on a book-length manuscript, and you can see how style sheets are an absolute must for people working on long documents.

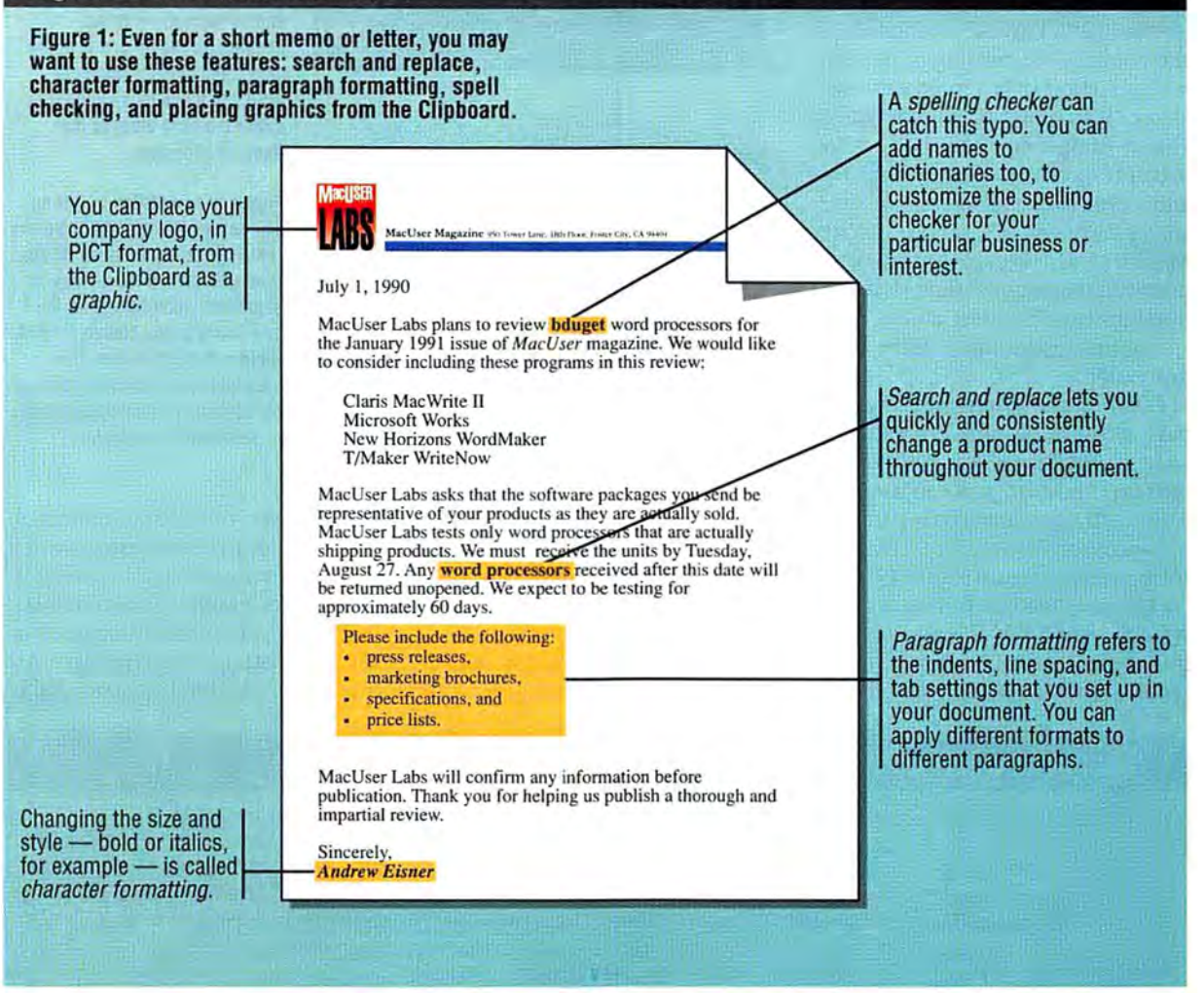
Once you've written your book or report, you'll want to put together an index and a table of contents. A high-cost word processor can automate this task. If you later update your document, creating a new table of contents and index will take minutes, not days.

Some high-end word processors also give you advanced graphics handling in your documents. One of the most highly touted (and often overused) features is the ability to wrap text around a graphic. A related but more useful feature is the ability to place a block of text anywhere on a page. This feature allows you to make pull quotes — text that appears in larger boldface letters to draw the reader into the document. In general, the higher the cost of the word processor, the more choices for page layout it offers.

— Paul Hoffman

Figure 1: Minimum Features

Figure 1: Even for a short memo or letter, you may want to use these features: search and replace, character formatting, paragraph formatting, spell checking, and placing graphics from the Clipboard.



undo your last command even after you've deselected the text or moved the cursor.

After determining how readily each word processor would let us get out of editing and formatting jams that our explorations might lead us into, we looked at capabilities common to all four word processors: formatting paragraphs and characters, finding and changing text and other items, creating headers and footers, designing stationery documents, and using spelling checkers.

Formatting paragraphs. To format a paragraph in any of these word processors, you use an on-screen ruler to set left and right margins, indents, and tabs and to align text and set line spacing. For precision formatting, MacWrite II also lets you enter all setup features in a dialog box.

WordMaker lets you set the ruler in units of inches; centimeters; picas; points; or if you really miss your typewriter, 10-pitch. MacWrite II provides inches, decimal inches, picas, points, millimeters, and centimeters. WriteNow gives you the option of inches or centimeters, and Works constrains you to inches alone.

All four programs let you copy formats from one paragraph to another. WriteNow goes one better and lets you change similarly formatted paragraphs with just a few keystrokes. If you select multiple paragraphs and then hold down the Shift key when making a ruler change, you change only those paragraphs whose settings are identical to those of the first selected paragraph. So if you had indented all your long quotes half an inch from the left margin but later decided to indent them from the right margin as well and if no other paragraphs except long quotes had the half-inch indent, then you would be able to quickly change all the quotes simultaneously.

Character formatting. The standard complement of Mac text styles includes plain, bold, italic, underline, shadow, superscript, and subscript.

The beauty of the Macintosh is that you can see these fonts and styles on-screen in WYSIWYG fashion. You can boldface the heading of the first major section of a report and then change it from the 12-point Palatino you are using for the main body of the text to 18-point Helvetica. WriteNow allows you to extend or compress the space between characters. With MacWrite II, you can select word underline, double underline, or strike-through text. This last ability is of special interest to those in the legal profession.

Finding and changing. Say you have a lengthy business proposal and want to see all the places you've used the term *low-cost;* you can use Find to do so. If you want to change all the instances of *low-cost* to *competitively priced*, you can use the Change (or Replace) feature. But what if you want to search for or replace something other than text — for example, replace one tab with two tabs or replace one paragraph return with two? Works lets you search for and replace only tabs and paragraph symbols (see Figure 2); WordMaker doesn't let you do even these.



Figure 2: Microsoft Works lets you search for and replace tabs and paragraph symbols. Clicking on the up arrow or the paragraph symbol instructs Works to place that element in either the Find What or the Replace With box.

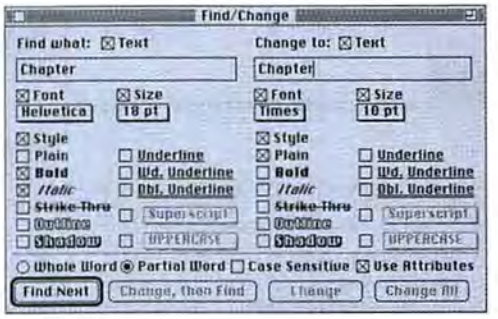


Figure 3: In addition to letting you search for and replace more than a dozen nondisplay items, Claris MacWrite II provides an extended Find/Change dialog box that lets you search for and replace text attributes. For example, you can easily change all 18-point Helvetica bold italic to 10-point Times plain.

MacWrite II — in addition to letting you search for paragraphs and tabs — gives you a list of more than a dozen codes you can use to search for such items as page breaks, column breaks, graphics, and footnotes. It also lets you find and change character formatting. Selecting Use Attributes in the Find/Change dialog

Shareware Word Processors

There are three reasons for checking out shareware instead of shrink-wrapped word processors. First, you may not need the power of a commercial package. Second, shareware is usually much, much cheaper than any package you can buy. Third, you can try out shareware before you write a check to the author. And by all means, if you're using a shareware program, write that check. No one gets rich from shareware; programmers do it for the love of the work and for the hope of small reward. In addition to sending a check, it's a good idea to note any bugs you find — shareware authors don't have the testing and research facilities of a Microsoft or an Ashton-Tate. If you find a bug, tell the author. Odds are good you can get it fixed.

Shareware is available from user groups, on-line services and bulletin boards, and some dealers. Two of the best shareware libraries are kept by BMUG (Berkeley Macintosh Users Group; [415] 549-2684) and BCS (Boston Computer Society; [617] 625-0165). Of course, our favorite on-line service is our own Zmac.

McSink 6.5 and **7.0** ($51.50 including documentation): Dave McWherter's fine DA word processor has metamorphosed into the commercial Vantage, but the shareware versions work just fine. Both versions listed are still commonly available, but you may want the earlier version, because word wrap was removed from version 7.0. Why? So the later version wouldn't compete with Vantage.

ConText 1.1 ($8): A new entrant into the world of shareware word processors. Although its features are more limited than McSink's, it does all the basics, such as word wrap and printing, handily. It's compatible with Adobe Type Reunion and supports all font sizes. ConText can also strip or insert carriage returns — a feature of special interest to frequent telecommunicators. And when you're talking about 8 bucks, who can complain?

JoliWrite 2.0 ($20; additional $5 for the next version): Benoit Widemann's offering is not as powerful a DA as McSink, but it does have a ruler, case conversion, full font support, auto-save, and search and replace. One idiosyncratic feature is the location of its menu, which you activate by clicking on the program's name in the upper left corner of the window.

MyWord 0.52 (free): This freebie from Eelpout Software can open or save only files smaller than 32K — about 16 pages — but if you write documents longer than that, you'll probably also need the features of a commercial program. MyWord features a ruler and word wrap and supports all type styles, although in a limited number of sizes. Notable are automatic word count and pop-up icons along the bottom of the screen.

miniWRITER 1.6 ($12): This popular program, by Acta author David Dunham, is a classic of the shareware field. It has no ruler, so text wraps to the size of the window, but you can tell the program to insert a hard Return every so many characters. miniWRITER can also turn normal quotes and apostrophes into smart ones and vice versa. Nothing flashy, just a workhorse.

Notepad++1.0 (free): Unlike the other shareware word processors, Notepad ++ is not so much a word processor — although it's entirely capable as one — as a complex replacement for the Notepad DA included with your Mac. Written by Alexander S. Colwell, Notepad++ can hold up to eight pages of 32K each, and it lets you create as many files as you like. It has a ruler and supports different fonts, styles, colors, and paragraph alignments.

— Daniel J. Rosenbaum

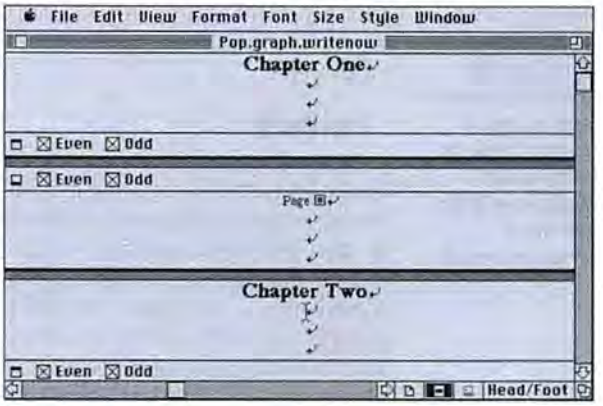


Figure 4: Unlike the other four bargain word processors, T/Maker WriteNow lets you have multiple headers and footers within a single document.



Figure 5: In Microsoft Works, you control headers and footers through the Page Setup dialog box. With this scheme, you can't set up a header on just right- or left-hand pages as you can with the other three programs.

box displays an expanded Find/Change dialog box that lets you search for and replace font, size, and style (see Figure 3).

Although WriteNow's list of codes is much shorter than MacWrite II's, WriteNow lets you use a wildcard character — typing a question mark in the Find/Replace dialog box lets you search for any single character, number, or time or date marker. When you tell WriteNow to search for *ca?*, for example, it stops at *can*, *car*, and *cat*. As we discovered in our tests (discussed later), how quickly each application could accomplish a search varied greatly.

Headers and footers. Headers and footers are text — and sometimes graphics — that is repeated at the top and bottom of each page of a document. You can use headers and footers for repeating a report title or for putting page numbers onto the same place on every page, for example. WriteNow lets you have as many different headers and footers as you like, so you can have more than one chapter or section header or footer within the same document (see Figure 4). With MacWrite II and WordMaker, you can have a different header and footer for right and left pages only.

MacWrite II and WriteNow both let you include graphics within the header or footer. WordMaker doesn't let you put graphics into your header or footer, but just as with WriteNow and MacWrite II, you can insert the Date, Time, or Page command to have the program update these items automatically.

Works is more limited in its use of headers and footers than any of the other three programs. It uses the Page Setup dialog box, much as Excel does, to let you enter text for a header or a footer. You have to enter formatting codes in the boxes if you want to center text; format the style of text; or make the text align to the left, center, or right. For example, the codes &d and &t tell Works to print the current date and time in your header or footer and &I makes it print the characters that follow in italic (see Figure 5). Although this coding method is not as easy as setting up headers and footers in any of the other programs, the documentation is well organized and accessible. You won't see your header and footer within your document, but you can preview the result of all your coding by selecting Print Preview from the Print dialog box. Nonetheless, it's still the least flexible of the four for headers and footers and not at all elegant.

Stationery. After you've gone to the trouble of formatting a proposal, you can save it as a template, or "stationery," document. All four programs let you save a document as stationery. When you open a stationery document, you are really opening a copy of the original. You can modify whatever text you need to and then save it under a new name without altering the original. Your stationery file remains unchanged, and you have a similarly formatted and edited document with a different name.

MacWrite II, WordMaker, and Works let you save a stationery file type, which means you can have as many stationery documents as you might need. In WriteNow, the stationery-document system is really a method for saving default settings; each time you select New from the File menu, the stationery settings appear in your Untitled document window. To create a stationery document, you must name the chosen document Stationery and place it in the same folder as your WriteNow application — thus, you can have only one stationery document at a time.

Spelling checkers. Regardless of the length of your document and your command of *Webster's Ninth New Collegiate Dictionary*, it's always a good idea to spell-check before you print.

WriteNow provides the largest

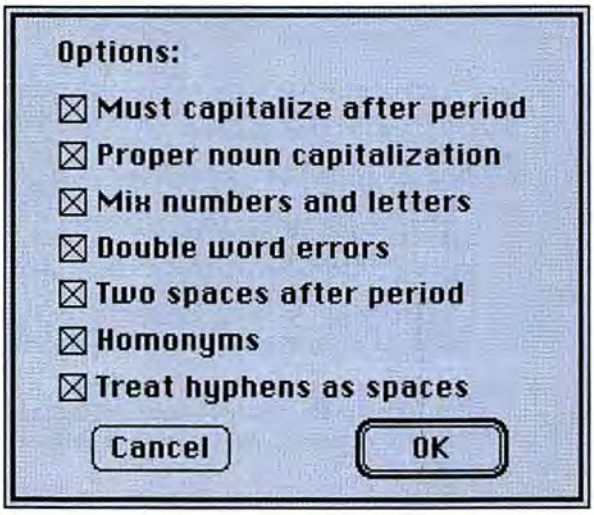


Figure 6: You can set Microsoft Works' spelling options to provide a more intelligent spelling check. Its ability to spot double-word errors *(the the)* is particularly useful.

dictionary, with 135,000 words. For those who want to save disk space, it also comes with a stripped-down version of 50,000 words that takes up only about 100K. WriteNow's spelling checker was uncanny in its ability to suggest the correct spelling for every typo MacUser Labs created. WriteNow also keeps track of which paragraphs it has spell-checked, so that after the first run-through, it checks only paragraphs that you've added or changed — a great speeder-upper. When you open WriteNow's spelling checker, it stays open and is ready when you need it.

MacWrite II and WordMaker also have an optional continuous spelling checker: The Mac beeps and the menu bar flashes if you misspell something as you're typing — either a welcome feature or a bit annoying.

Works' spelling checker is strictly a "modal" feature. You must open the spelling checker, use it, and then close it before you can go back to editing your document. You can customize it via the Options setting to find repeat instances of a word (see Figure 6); to check for capitalization after a period; and to stop at homonyms — *their*, *there*, and *they're*, for example.

Fast Words

Although speed is not the most important factor in choosing a word processor, poor performance can turn an otherwise innocuous task — such as searching for a word in a long document — into a source of stress and frustration. To see how the four bargain word processors placed, we brought out our digital stopwatch and launched each program on a 1-megabyte SE. (The Classic and LC had not been released at test time.) We then imported four different file types and timed performance in a variety of editing and formatting tasks.

Importing and exporting files. Our four test files consisted of an ASCII text file, a Word 3.0 file, a MacWrite 4.5 file, and a MacWrite 4.5 file with graphics. The results for importing the ASCII text file and the MacWrite 4.5 file with graphics are shown in Figure 7. WriteNow and WordMaker were the text-import champs, with MacWrite II taking nearly twice as long and Works lumbering far behind. Only MacWrite II and WriteNow were able to import the Word 3.0 file. Both programs also

Bundled Bargains

If you're on a three-week survival course in the Rocky Mountains, you may want a Bowie knife and a complete set of climbing and camping tools. But if you're spending one night in a sleeping bag in the Berkshires before driving home from a Tanglewood summer concert, a Swiss army knife may do just fine. The Swiss army knife of Mac software has long been Microsoft Works. This single package provides entry into a broad range of computing activities by combining word-processing, spreadsheet, database, and communications programs. At $295, it's about $100 cheaper than Microsoft's stand-alone word processor, Word 4.0, and you can easily find it discounted to prices less than $200.

Works stands out in ease of use for word-processing tasks that require help from its other modules. For example, it's easy to incorporate a chart from the spreadsheet program into a Works word-processing document. Mail-merge is conducted hand in hand with the database program, with the database program doing most of the work. Unfortunately, when used all by its lonesome, the word-processing module is uninspired. Editing control is limited, and



complex formatting is simply out of its range.

T/Maker overcomes some of the shortcomings of Microsoft Works with its new SmartBundle ($349). Rather than using the Swiss-army-knife approach, T/Maker provides a complete set of camping tools by bundling WriteNow 2.2 (a word processor), SuperPaint 2.0 (a painting and drawing program), RecordHolderPlus 3.1 (a database program), and Full Impact 1.1 (a spreadsheet program). What's more, all are tied together with SmartBundle Launch, a customized version of CE Software's DT Launch, to allow easy access to each application even without the use of MultiFinder.

provide several translation filters; MacWrite II reads and writes more than 30 file formats, including PICT and MacPaint. Microsoft's RTF (rich text file) format serves as an intermediate step in conversion between WriteNow and other file types, which could possibly explain WriteNow's lackluster performance when importing a MacWrite 4.5 document.

None of the four were able to translate the MacWrite 4.5 auto-page-number symbol that we placed in the document's footer. But on the whole, each did a good job of holding on to character and paragraph formatting. Besides being slow overall, Works fell flat as a graphics importer. Graphics straddled page breaks and sometimes fell on top of text instead of floating above it.

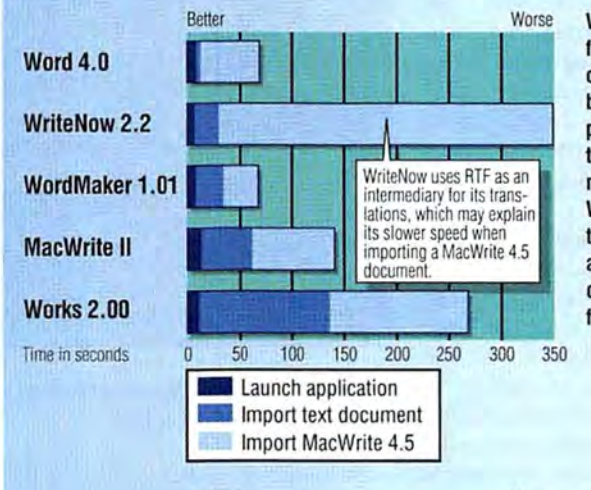
Searching and replacing. Searching through a document and making changes is something you'll want your word processor to do quickly and without a lot of commotion. WriteNow is the Carl Lewis of word processors when it comes to searching out a word (see Figure 7). And if you change your mind, it can undo the changes faster than it made them in the first place and nearly 50 times as fast as Works can. To be fair to slow-but-sturdy Works, we should remind you that MacWrite II and WordMaker are incapable of undoing a search-and-replace action — a serious drawback.

Global font and size changes. When you have a long document and make global changes to the size or the font, you watch as the Mac's clock spins before you get your cursor back, because these changes affect the document's pagination. The Mac has to spread the text out over the document, using the newly chosen font or size.

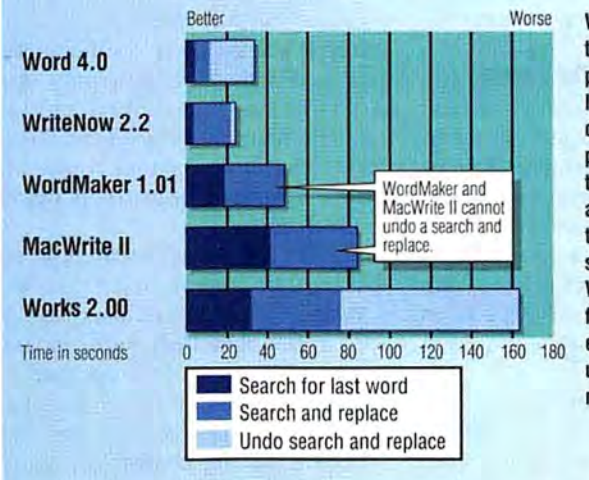
Works and MacWrite II repaginate only the current, on-screen page. The result is that global changes seems almost instantaneous, but when you move to a different part of the document, the clock spins again while the

Figure 7: Speed Tests

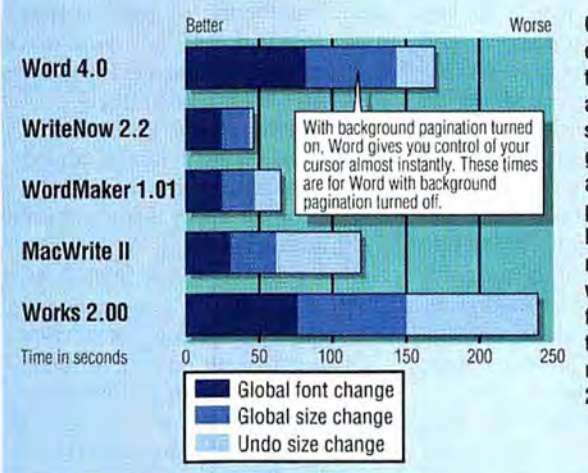
Figure 7: We ran our suite of benchmarks on an SE, using documents that were similar to common business reports and that included a variety of text and graphic elements, headers and footers, and bulleted lists. As a point of comparison, we also ran the same tests with the best-selling Mac word processor, Microsoft Word 4.0.



WriteNow launches faster than any of the other word processors, but importing a 25-page MacWrite 4.5 file took it more than five minutes. Although WordMaker imported the file about ten times as fast, it can import only text and MacWrite files.



We clocked the time it took each word processor to find the last word in the document. WriteNow performed faster than the other programs and took even less time to undo the search and replace. WriteNow's Undo feature is the most extensive, letting you undo even after moving the cursor.



Global font and size changes often occur in the background during a word-processing session. To avoid giving unfair advantage to word processors that have background repagination features, we timed the global font and size changes to include repagination of the 25-page document.

deferred repagination takes place. The difference between repaginating a page at a time and repaginating an entire document can be dramatic. MacWrite II, for example, updated the screen after a global change in a little more than four seconds. But when we scrolled through the document, the constant repagination added to MacWrite II's total time, so it ended up taking longer than WordMaker and WriteNow. Poor Microsoft Works again finished last (see Figure 7).

With minor variations in flexibility and more-pronounced differences in speed, all four of the applications we tested are able to handle basic word-processing tasks. This is to be expected — without the ability to move text blocks around at will, search for text, and replace one word with whatever you want, you might as well stick with a typewriter.

More Features in the Bargain

If and when your needs go beyond writing simple memos, letters, or short reports, you'll need other features that a bargain word processor may or may not give you. A consultant, for example, might want to prepare a proposal with a report title on each page, the opinions of experts in footnotes, and impressive graphs in an appendix.

Footnotes and endnotes. The ability to make footnotes is a must for any kind of academic or legal word processing, but you won't get any more help from WordMaker and Works than you did from your typewriter. Both WriteNow and MacWrite II, on the other hand, let you enter footnotes easily and then forget about them. If you delete a footnote, the numbers for all the others automatically change accordingly. WriteNow alone lets you put pictures into footnotes, and you can have footnotes of any length. You can also insert the page number, time, or date automatically from a menu selection.

WriteNow keeps footnotes in a separate window, which makes it easy to edit and format them all at once (see Figure 8). When you're at the point in your text where you want a footnote, choose Insert New Footnote and the Footnote window pops up. After you have finished typing the footnote text, clicking on the Page View icon in the bottom corner of your screen returns you to your place in the main text.

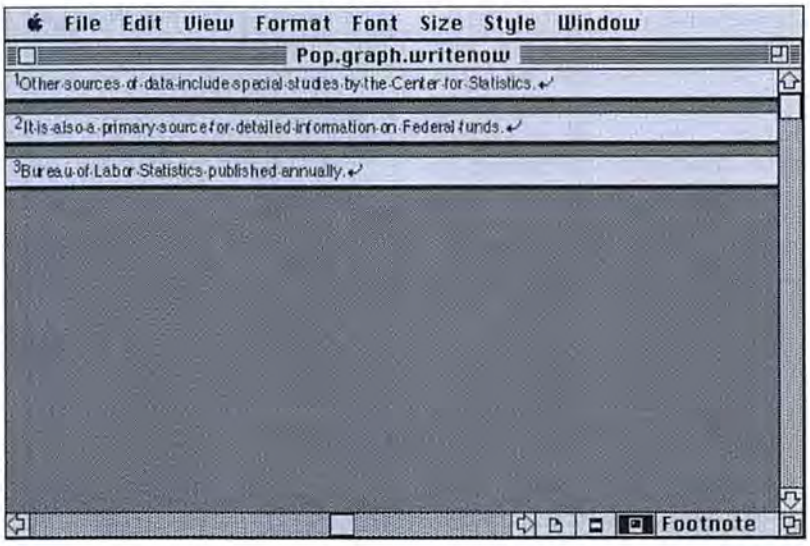


Figure 8: T/Maker WriteNow keeps footnotes in their own window, making it easy for you to edit and format them all at once.

MacWrite II doesn't keep footnotes in a separate window, but it does let you select whether footnotes should appear at the bottom of the appropriate page or at the end of the document. WriteNow doesn't let you make endnotes. In either program, you can choose a starting number for automatic numbering of footnotes, but only MacWrite II lets you mark footnotes with characters (up to nine of them) rather than numbers.

Styles and style sheets. A *style* is a formatting element that holds formatting characteristics in one place so that you can apply them again and again to selected text. A *style sheet* contains all the styles related to a single document. If you create long documents with a variety of text types — a report with several levels of headings or subheadings, for example — you will want a word processor that lets you format similar text items quickly. Who wouldn't want to format one heading or one quote and then, with a single command, apply either of those formats to all subsequent headings and quotes? WriteNow and MacWrite II have

Figure 10: Mail-Merge

Figure 10: When a program performs a mail-merge operation, it replaces variables in a master document with names from a data document.

name, address, city, state, zip
Cecile Ashby, 1546 E. 2nd Place, San Bruno, CA, 94066
Sheldon Awl, 45 Seaspray, Pacifica, CA, 94044
Jim Barber, 6789 Windward Way, El Granada, CA, 94070
Jesse Brazil, 257 Camino Alto, Moss Beach, CA, 94112
Leonard Cookson, 839 Wildwood, San Francisco, CA, 94112
Brendan Devine, 1545 East Shore Drive, Alameda, CA, 94501

The *data* file contains rows of names, addresses, and other information (fields) that will be merged with the form, or template, letter. Each row makes up a *record*. The top row in the file contains the names of the fields. This file is usually a plain-text file, and it can be extracted from a database.

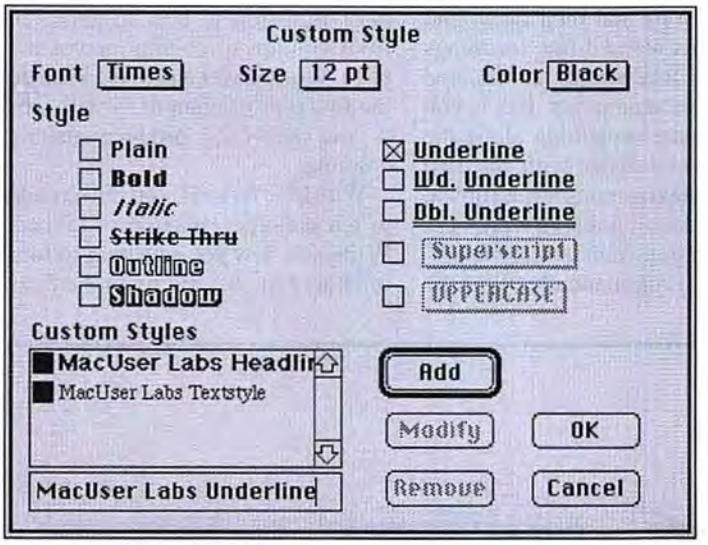
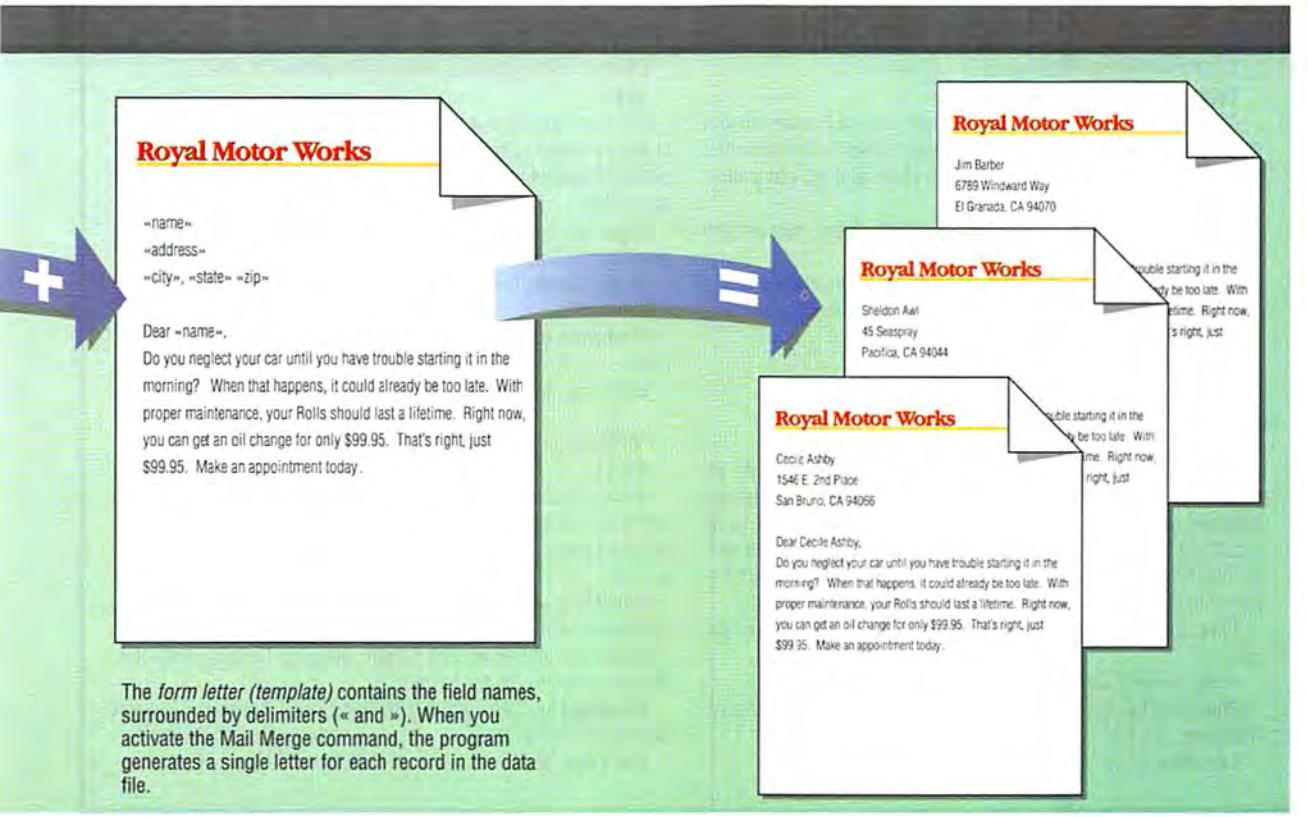


Figure 9: Claris MacWrite II lets you add up to 30 custom styles to the Style menu by entering your specifications in the Custom Style dialog box.

adopted various methods of speeding up character formatting along the lines of this style-sheet system.

With WriteNow you can copy character formats by clicking on the text that already has the font, size, and style you want to copy and then choosing Copy Font/Size/Style from the Edit menu. Next, you select the text to which you want to copy this character formatting, and choose Paste Font/Size/Style from the Edit menu. You can quickly change all text that shares character formatting to a new character format by holding down the Shift key while choosing Paste Font/Size/Style. Even if you select the entire document, only the text with the same font, size, and style will be changed. This feature lets you, for example, change all underlined Helvetica text to boldface Palatino in one quick step.

MacWrite II takes a slightly different tack by providing a Custom Style dialog box (see Figure 9). You can create up to 30 custom styles — specifying the font, size, and type style — and add them to the Style menu. Then you can use a single command to change all the style attributes of the text you select, or you can begin typing in a custom style any time you like. This is something WriteNow doesn't offer. MacWrite II does not, however, provide any equivalent of WriteNow's option for



The *form letter (template)* contains the field names, surrounded by delimiters (« and »). When you activate the Mail Merge command, the program generates a single letter for each record in the data file.

quickly changing all identically formatted *paragraphs* to a new format. So overall, MacWrite II and WriteNow match up pretty evenly in their attempts to offer fast formatting, although WriteNow's method has more global power.

Columns. Remember setting up columns on your typewriter? You set tab stops wherever the columns were supposed to be and then typed and tabbed. This worked fine for things such as balance sheets and income and expense statements. But if you want to create something along the lines of a newsletter with justified columns of text running up and down, this method isn't going to work very well. What you want is *snaking columns* — text automatically filling the page from top to bottom and then from column to column across the page. WordMaker and Works can do the first type of column — with tabs — but they can't produce snaking columns.

With MacWrite II, you can have up to ten columns, snaking or tabbed. WriteNow lets you select up to four of either type of column in the Page

Capsule Reviews









Claris MacWrite II

★★★★

MacWrite II is powerful yet easy to use. You can create custom styles and add them to your menu for faster character formatting. It supports translation for more than 30 Mac- and PC-compatible applications.

Pros: Powerful search-and-replace function. Easy, menu-driven mail-merge.

Cons: Can have only one header and footer for each document.

Published by: Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 987-7000.

List Price: $249.

Microsoft Works 2.00

★★★★½

Microsoft Works has been the integrated package of choice for years. In addition to the word processor, you get spreadsheet, database, and telecommunications modules. The package is an excellent value, but the word-processing module is slow and inelegantly featured. Although the overall package gets a four-and-a-half-mice rating, the word-processing module rates three mice.

Pros: Can customize the spelling checker. Quite easy to learn and use.

Cons: Slowest. Clumsy footer and header creation.

Published by: Microsoft, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 89073-9717; (206) 454-2030.

List Price: $295.

New Horizons WordMaker 1.01

★★★½

No fuss, no muss. A simple, easy-to-use word processor that doesn't pretend to be anything more than it is. It comes with an excellent manual, weighing in at less than 100 pages and completely accessible.

Pros: Least expensive. Very fast. Can sort paragraphs. Better graphics handling than you'd expect from a low-cost word processor.

Cons: Limited feature set and importing capability. Cannot do footnotes.

Published by: New Horizons Software, Inc., P.O. Box 43167, Austin, TX 78745; (512) 328-6650.

List Price: $124.95.

T/Maker WriteNow 2.2

★★★★½

A brisk-running, reasonably priced package that comes bundled with Grammatik Mac 2.0, a 1.4-million-word thesaurus, and templates for Avery mailing labels. A great value for the money and easy to learn and use.

Pros: Multiple headers and footers per document. Separate footnote window for editing and formatting ease.

Cons: Cannot set top and bottom margins. Can't do endnotes. Multiple columns limited to four.

Published by: T/Maker Co., 1390 Villa Street, Mountain View, CA 94041; (415) 962-0195.

List Price: $199.

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Setup dialog box. Both MacWrite II and WriteNow take into consideration other page-setup features, such as margins, and calculate the column width to make the columns equally wide. In WriteNow, the spacing between columns is determined by the left and right paragraph margins within the column. MacWrite II lets you specify the space between columns in the Page dialog box. You can also mark the Title Page box selection so that column settings don't apply to a particular page within your document. WriteNow also provides templates for making standard Avery labels.

Graphics. Chances are, one of the main reasons you wanted a Mac so desperately was for its graphics capabilities. All four programs let you place a graphic from the Clipboard into a document, and MacWrite II's Insert File command also lets you insert a MacPaint or PICT file without going through the Clipboard.

Both MacWrite II and WriteNow place the graphic within the line of text, and WriteNow lets you move the graphic up or down by superscripting or subscripting — both programs treat graphics in the same way as they treat text. WordMaker handles graphics much better than you would expect from a low-cost package, layering them separately from text. It even provides a word-wrap selection, which lets text flow around the outline of a picture (see Figure 11). Works also keeps graphics separate from the text and even gives you a drawing toolbox.

Mail-merge. We've probably all received that same sweepstakes letter — the one telling us we've won a trip to Coral Gables for the entire *(your last name here)* family. This is an example of mail-merge on a grand — in quantity, at least — scale. It lets you combine a *data document* that contains groups of information arranged in *records* (names and addresses, for example) with a form, or *template*, letter containing placeholders, or *field names*, for each item in the records (see Figure 10).

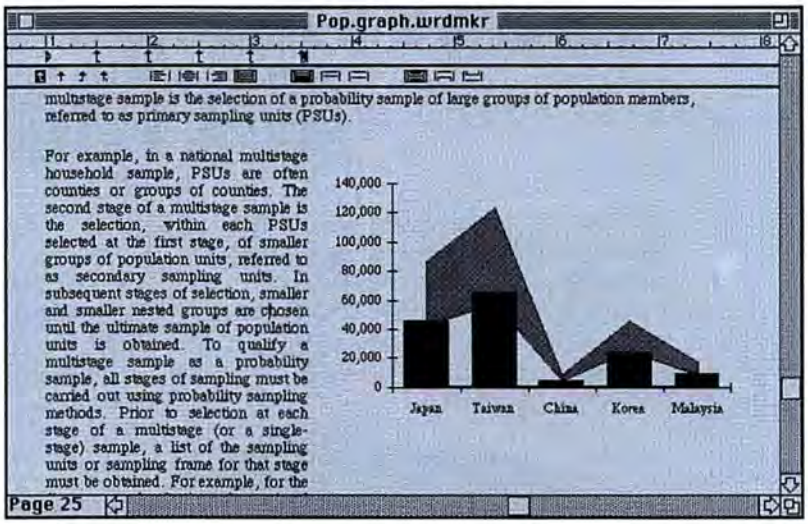


Figure 11: New Horizons WordMaker layers graphics separately from text. By shortening the margin for a text paragraph next to a graphic, you can accomplish the appearance of the automatic text-wrapping feature of high-end word processors.

During a merge, the names, addresses, and other information (such as the balance due, in a billing letter) in the data document replace the field names in the form letter and generate a new, personalized letter for each record in the list. The techniques used to do this vary from program to program, but all four of the bargain word processors can do basic mail-merge. Works and WordMaker are also smart enough to print only a portion of the data file, as long as you tell them the correct record numbers.

Beyond basic field-name selection, MacWrite II and WriteNow offer powerful capabilities through the use of conditional statements. You can use IF/THEN/ELSE statements to specify if certain text should or should not be inserted into the final letter. For example, you can place a statement in your form letter to specify that IF the data record at hand has a value greater than $0 in the Amount Due field, the program should THEN plug in the sentence "Please remit promptly." If that's not the case (ELSE), the program should print the sentence "Thanks for keeping your account up-to-date." Both programs

On the Horizon

Bargain may take on new meaning when DeltaPoint's Taste ($149) is released. Announced in August '90 at an introductory price of $99, the program wasn't quite ready for shipping at press time. If it does all it promises — and does it well — it could give a lot of word processors a run for their money.

According to DeltaPoint, Taste is designed to be a full-featured word processor, providing tools such as style rulers; multiple stationery documents; automatic hyphenation; footnotes; endnotes; headers; footers; a 1.4-million-entry thesaurus and a 117,000-word dictionary; and mail-merge, which can be used with Taste's built-in address book.

But wait — there's more. Taste will also give you complete control over page layout, including the ability to create multicolumn pages and columns of varying widths and the ability to apply any layout to any range of pages in a document. And there's still more — a complete drawing layer with a full set of tools, the ability to import PICT and EPS files, and the ability to anchor pictures to a specific position on a page. Ah, so many features, so little money

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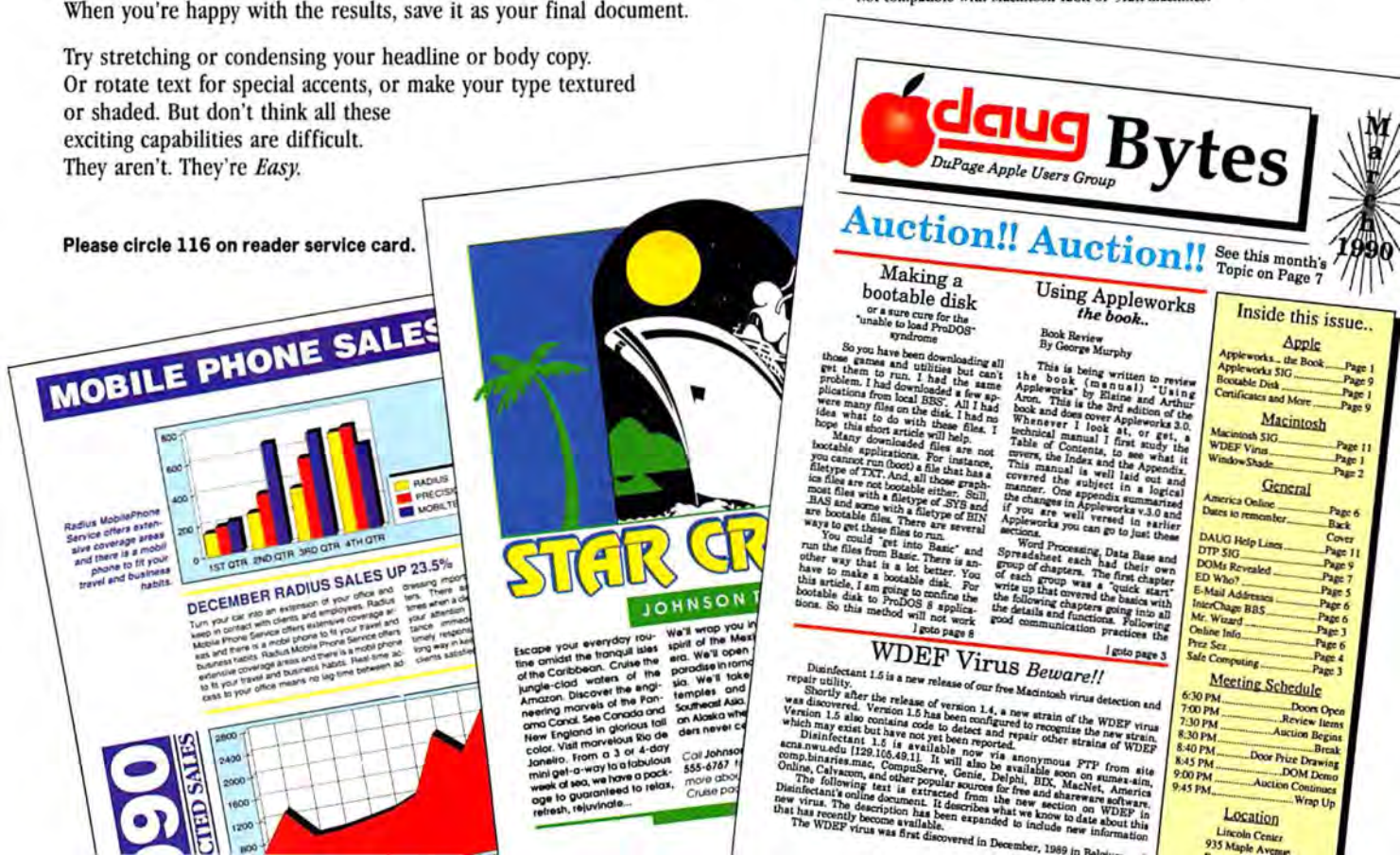
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also provide a way to combine two instructions so that more than one condition has to be met. This lets you, for example, specify that if a relative owes you money (<<IF relative=Yes>>), you can add "Please bring your checkbook when you come for dinner next Sunday."

If all this sounds a little too much like programming, you might be relieved to know that MacWrite II helps by providing menu-driven mail-merge. You place field names and conditionals in your document via the Open Merge Data File dialog box, where a scrolling list contains all the field names in the data document and all supported conditional commands. You can insert fields and commands by positioning the cursor in the form letter and double-clicking on the field name or command in the list. It can even place the *field delimiters* (« and ») around the field names for you (field delimiters tell the application that the field names are not simply text). In the other word processors, you must use a two- or three-key combination to place the delimiters around each field name.

Able-Bodied Bargains?

These low-cost word processors pack a lot of features for the dollar, but they still might not have enough. You can always give them a features booster shot by adding stand-alone programs for outlining, grammar checking, bibliographic indexing, and the like (see "The Right Tools for the Write Job," September '90, page 241). Then again, if you're considering a bargain word processor because you're cost-conscious, the add-on route may not be very practical — it might be more cost-effective to buy a full-featured, higher-priced package such as Microsoft Word 4.0, Nisus 3.07, FullWrite Professional 1.5, or WordPerfect 2.0 ($395 each).

The Final Word

Investing in a Mac doesn't end when you bring the hardware home. You need software, and one of the first programs most people buy is a word processor. Many high-performance, high-priced word processors are available, but if you're cost-conscious — and a little reluctant to tackle a program that puts the power of a publishing house onto your desk — you still have a respectable field of candidates to choose from.

Each of the word processors we tested offers features such as headers and footers, search and replace, stationery documents, mail-merge, and spell checking. MacWrite II and WriteNow offer more-advanced variations of some of these features, particularly mail-merge. These two programs also provide more-advanced capabilities — footnotes, snaking columns, and speed-formatting techniques akin to style sheets, for example. WriteNow's speed is hard to beat, but MacWrite II offers many dialog-box-driven functions that make it extremely easy to use for functions that can be difficult to master, such as mail-merge. If you don't expect ever to need advanced capabilities such as the ability to create footnotes or columns, WordMaker should be sufficient — it's both fast and simple. Finally, even though Microsoft Works' other software modules — database, spreadsheet, and telecommunications programs — perform well, its word processor's performance is lackluster.

We tested each word processor for speed when performing common tasks, but raw performance shouldn't be the determining factor in choosing the ideal word processor — although you might want to avoid a real laggard. Speed is important, but determining your individual needs is always the first step. For our opinion, look at "The Bottom Line."

Charles Spezzano is the author of numerous articles and books about psychology and personal computers. Kelli Wiseth is a *MacUser* associate editor. MacUser Labs would like to thank Ron Gallagher for conducting the tests.

The Bottom Line

Using a full-featured, top-of-the-line word processor to produce a simple memo is like swatting a fly with a Buick. The fly will die, but you'll have wasted a lot of power. A bargain word processor is the office flyswatter: It's simple and quick, and it gets the job done — as long as the job is not too complex.

Of the four bargain word processors we tested, we recommend T/Maker's **WriteNow 2.2** ($199). It's fast, it's easy to use, and it fits easily on a floppy disk along with documents and System files. WriteNow gives you plenty of powerful features without sentencing you to a long haul on the learning curve. You'll be able to quickly and intuitively set up long documents with a variety of headers and footers, add footnotes, and number pages automatically. WriteNow's spelling checker can stay open during your entire session, so you won't forget to spell-check before printing.

Our second choice is Claris' **MacWrite II** ($249). It's very easy to use, with many features accessible through dialog boxes — a great aid in mail-merge. MacWrite II also has powerful import and export capabilities; it can read and write more than 30 file formats, including PICT and MacPaint. If you're the impatient type, however, be warned: It's not as fast as WriteNow.

If money is the key issue, New Horizons' **WordMaker 1.01** ($124.95) is an excellent choice. WordMaker has a smattering of features not found in any of the other three programs, such as the ability to sort paragraphs in ascending or descending order. Keep in mind that at its low price, it's missing features such as the ability to create columns and footnotes, but if all you want is a little speed and simplicity, WordMaker should suit you just fine.

If you need an integrated program, slow-but-steady Microsoft **Works 2.00** ($295) has always been the only choice. It's very easy to use, and its documentation does a good hand-holding job. Many new contenders are entering the arena, however, including T/Maker with SmartBundle.

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Introducing the Microtek TrueLaser printer. A revolutionary new laser printer that gives you TrueImage plus PostScript and PCL compatibility. All for less than $2700.

This is the first printer to bring TrueImage technology to your desktop. Giving you absolute WYSIWYG fonts. With faster on-screen display. And faster printing.

RESIDENT APPLE 35 TRUETYPE FONTS

TrueImage is the new printer standard. It contains TrueType, the same font technology that will go into every Macintosh running System 7.0 and IBM PC running Windows.

Which is why the world's leading font foundries are already designing with TrueType.

But it's comforting to know you won't have to leave your past behind. Because TrueLaser is also PostScript compatible, so you can continue to use your current library of PostScript fonts.

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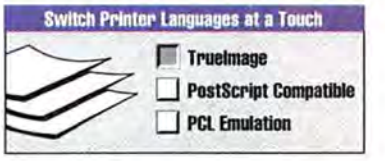
Select from AppleTalk, Centronics or RS-232C printer ports.

What's more, TrueLaser is powered by the fastest microprocessor available today, the AMD 29000. Resulting in performance far superior to the 68000 or 68020 microprocessors found in most laser printers. Which means you'll spend a lot less time waiting to see what your work really looks like on paper.



And you can choose between AppleTalk, Centronics and RS-232C connections. But whatever you choose, TrueLaser's 300 DPI resolution will have all of your graphics and layouts looking their best.

Call, 1-800-654-4160 or in California, 213-321-2121 for the name of the authorized Microtek dealer nearest you.



And get a real close look at the laser printer that's brought an end to the font wars.

It'll make you look like a winner.



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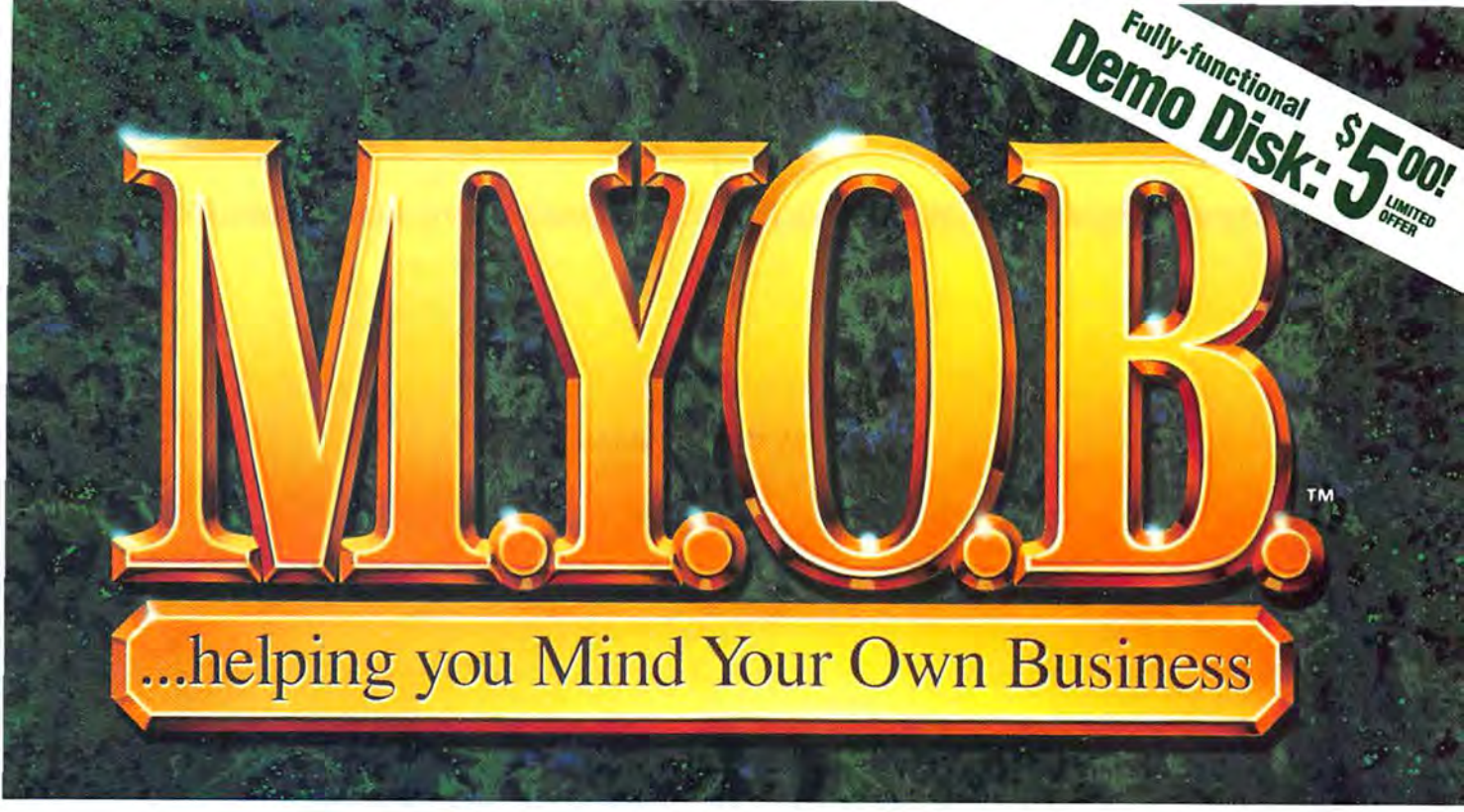
•**Microtek Lab, Inc.**, 680 Knox Street, Torrance, CA 90502, (213) 321-2121 (800) 654-4160. •**Microtek International Inc**, No. 6 Industry East Road 3, Science-Based Industrial Park, Hsinchu Taiwan, 30077, R.O.C., 886-35-772155 •**Microtek Electronics Europe, GmbH.**, Schießstraße 72, D-4000 Düsseldorf 11, F.R. Germany, 49-211-526070 • ©1990 Microtek Lab, Inc. All rights reserved. TrueLaser is a trademark of Microtek International, Inc. TrueImage, Windows and OS/2 are trademarks of Microsoft Corporation. TrueType, Macintosh and AppleTalk are trademarks of Apple Computer, Inc. IBM is a trademark of International Business Machines Corporation. PostScript is a trademark of Adobe Systems, Inc. Centronics is a trademark of Centronics Data Computer Corporation. All other trademarks or registered trademarks are the property of their respective holders.

Please circle 190 on reader service card.

Table 1: Features of Bargain Word Processors

● = yes ○ = no	Claris MacWrite II ♦♦♦♦	Microsoft Works 2.00 ♦♦♦♦½*	New Horizons WordMaker 1.01 ♦♦♦½	T/Maker WriteNow 2.2 ♦♦♦♦½
List price	$249	$295	$124.95	$199
Configuration				
Size of basic application	451K	591K	139K	125K
Size fully configured	1,319K	910K	396K	242K – 1,203K
Memory required	1 megabyte	768K	512K	200K – 475K
Spelling-dictionary size (words)	100,000	60,000	100,000	50,000 or 135,000
Thesaurus size (words)	660,000	NA	NA	1,400,000 or 470,000
Characters/fonts				
Font sizes available (points)	1 – 500	1 – 72	4 – 127	4 – 127
Small caps	●	○	○	○
Strike-through	●	○	○	○
Extend/condense	○	○	○	●
Show nonprinting characters	●	○	●	●
Math typesetting	○	○	○	●
Find/change				
Tab/Return	●	●	○	●
Wildcard	○	○	○	●
Formatting				
Maximum page width	limited by printer	15 inches	limited by printer	limited by printer
Style sheets/speed formatting	●	○	○	●
Page number, time/date stamps	●	●	●	●
Change case	●	○	●	●
Auto-numbered footnotes	end of page/document	○	○	end of page
Graphics				
Import via the Clipboard	● plus Insert File command	●	●	●
Drawing tools	○	●	○	○
Headers/footers				
Accepts graphics	●	○	○	●
Odd/even-pages option	●	○	●	●
Multiple	○	○	○	●
Page makeup				
Maximum number of columns	10	1	1	4
Auto-parallel columns	○	○	○	○
Snaking columns	●	○	○	●
Text wraps around graphics	○	○	●	○
Create boxes or borders	○	●	○	○
Leading/line-spacing control	●	○	●	●
Other				
Paragraph sorting	○	○	●	○
Mail-merge	●	●	●	●
Keyboard sentence select	●	○	○	○
Keyboard paragraph select	●	○	○	○
	Claris Corp. 5201 Patrick Henry Dr. P.O. Box 58168, MS C-12 Santa Clara, CA 95052 (408) 727-9054	Microsoft 16011 N.E. 36th Way P.O. Box 97017 Redmond, WA 98073 (800) 426-9400 (206) 882-8080	New Horizons Software P.O. Box 43167 Austin, TX 78745 (512) 328-6650	T/Maker Co. 1390 Villa St. Mountain View, CA 94041 (415) 962-0195

*This is the mouse rating for the package as a whole; the word-processing module alone is worthy of a three-mouse rating.



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BY SHELLEY ZULMAN

BUYING SMART

You don't need technosmarts to choose the right hardware and software. Here's some help from MacUser — and Mr. Smart Consumer himself, David Horowitz.

If you have a valid credit card and can dial a toll-free number, you have about all you need to buy computer equipment and software these days. And in a perfect world, this would be enough to bring you perfect satisfaction. The product of your dreams would be delivered to your doorstep overnight at minimal charge, it would do everything you hoped for (and more), and it would never break down.

In the real world, unfortunately, things rarely work out this way. Remember the time you ordered that nifty grammar checker, only to find out it wasn't compatible with your version of Microsoft Word? Or when you needed to get a graphics program overnight for a special client? Yes, the program arrived — two weeks later —



but the client (and his money) was long gone. And speaking of going out of business, what about the company that declared bankruptcy right after you sent in your printer for repair?

There's no way to anticipate every disaster—it really *is* just a coincidence that your hard drive died a day after the warranty expired. But before you plunk down your hard-earned cash for the latest in Mac goodies, you need to arm yourself with common sense, research, and a basic knowledge of consumer rights. This article supplies the ammunition, including a rundown of the questions to ask before, during, and after the sale; advice on mail order, warranties, and service contracts; and tips on finding a good dealer. Once you have this shopping savvy, you should be able to get the best deal with a minimum of unpleasant surprises.

ILLUSTRATIONS: ANTHONY RUSSO



Before You Buy

First, you need to know exactly what you want to buy and why you need it. Whether you're buying a word-processing program or a laser printer, there will be several candidates to choose from. You can simplify your search by comparing your requirements with the products' features.

Start by figuring out what your needs are. If you're buying a word-processing program, for example, do you write simple letters and memos or do you need sophisticated formatting such as multicolumn layouts and drop caps? What's your price range? If you're buying hardware, how much use will the product get and how many people will be using it? What software will you be using with it? What are the upgrade options?

Once you know what features you want, you can start comparing products. To gather information, quiz other users — friends, coworkers, bulletin-board users, or user-group members. Some companies let you borrow products for free trial periods; others allow you to download demonstration packages from bulletin boards. (These programs are almost identical to the actual product, except that some features, such as printing, are disabled.)

Many computer magazines review software and hardware; you'll find them at libraries, bookstores, and newsstands. Although *MacUser*'s mouse ratings, for example, are a quick and easy way to weed out products that are substandard or that you don't want to consider, don't base your buying decision on ratings alone. You need to read the entire review to get a better picture of the product and its features and to put the grade into perspective. One product may be rated highly for features that you don't need; a slightly lower-rated product might have fewer features but a set of abilities that suits you better. If more than one product is reviewed and the results are close, look carefully at the criteria used to make



Tips for First-Time Buyers

David Horowitz — radio and television consumer commentator, syndicated columnist, and host of the TV show "Fight Back! with David Horowitz" — bought his first computer a few years back. Here he shares some tips with first-time buyers.

Buying a computer and accessories can be a complicated business with plenty of traps for the unwary. But whether you're buying a computer or a TV set, the rules are the same: know your needs, shop and compare, stay within your budget, check out the warranty, and deal with a reputable retailer. Here are a few guidelines that will help guarantee your satisfaction.

Cash or credit? Many buyers prefer to pay cash rather than to use a credit card for major purchases. But you may be better off using your credit card and then paying it off before you accumulate significant interest charges. The primary advantage is buyer protection. If what you bought is not delivered as ordered, if it's defective, or if it's not as advertised, you can contest the charge to your credit-card company. You'll be credited for the amount of your purchase without having to fight with the retailer about it. That's the law. In addition, certain credit-card companies will extend your warranty if you use their card to make your purchase.



Like most first-time computer buyers, consumer pundit David Horowitz vastly underestimated his needs. "I thought I was overbuying, but it's turned out to suit me just fine," he says.

Mail order or dealer? If you don't know whether to buy from a dealer or a mail-order house, here are a few points to consider. The primary advantages of dealing with a computer store are that you get personal service and the chance to play around with the equipment or software you're thinking of buying. Also, if you have any questions, there's someone there to answer them; if you have a problem later on, the retailer is there to make it right (assuming you didn't pick a store on the brink of bankruptcy).

The most obvious advantages of buying by mail are price and convenience. Not only do mail-order houses offer hefty discounts, but you may also avoid paying your state's sales tax if the company is in another state (your state franchise-tax board can tell you if this is true where you live).

There are other advantages to buying mail-order goods. Federal trade regulations require that mail-order retailers deliver the goods within 30 days or offer you the option of waiting for shipment or taking a refund. When ordering by mail, however, be sure you understand the company's return policy. Will the retailer refund your money if the particular piece of hardware or software doesn't suit your needs? Some retailers will, some won't.

New or used? Buying through swap meets, back-alley shops, and gray-market retailers is risky business — a bit like investing in junk bonds. The profits (or in this case, the savings) may be considerable, but so are the financial hazards. If the merchandise is new, then you're covered by the manufacturer's warranty, but that's all. There is no after-sales service or support once the seller's disappeared.

You can't take warranties for granted, especially with gray-market merchandise. These are goods manufactured for sale

the judgments — you may actually prefer the features offered by lower-rated products. In other words, do your homework.

Shop Around

After you've decided *what* to buy, you next have to decide *where* to buy it — from a dealer or computer store or through a mail-order company (see the "Tips for First-Time Buyers" sidebar). If you want to try out the equipment before you buy, or if you want expert advice when buying expensive or high-end software such as an accounting or CAD package, doing business with a reliable local dealer is generally the best way to go (see the "Finding a Good Dealer" sidebar).

Mail order is a good bet for most software and non-Apple hardware. Most mail-order houses offer big discounts — sometimes as much as 40 to 60 percent off list price — and have good return policies. The larger companies keep nearly every software title in stock, and many offer overnight delivery for $3 to $5. Many mail-order houses offer 120-day repair or replacement policies and will refund most purchases if you return a product within 30 days. Large mail-order houses often provide cheap or free technical support over the phone too. To help you determine if a mail-order house is reputable, see the "Ten Questions to Ask a Mail-Order House" sidebar.



Whether you're buying from a dealer or from a mail-order house, find out exactly what you're going to get for your money. Ask what manuals and installation guides accompany the product and, with software, how much memory you need to use the program adequately. Is the product compatible with your system? Do you need to buy anything extra to install, set up, or use the item? Many mail-order houses buy their products from distributors rather than from manufacturers. When distributors buy and package components sold by factories, they often include parts — such as cables, utility software, or manuals — from various sources. Sometimes distributors sell deluxe packages that include specialized manuals and bonus utility software, but in other cases, the price the mail-order house quotes doesn't include the accessories you want, such as cables. The only way to find out what's included is to ask.

Read the Warranty

Now that you know what to buy, find out what protection is available to you if the product is defective or doesn't meet your expectations. Manufacturers guarantee almost every product with a warranty, which is usually an agreement to replace the product and documentation if you discover defects in the materials or workmanship during a specific time period after purchase. The warranty should state exactly what the manufacturer does and doesn't cover. For information about warranty terms, see the "How to Read a Warranty" sidebar.

Warranties typically cover time periods ranging from three months to a year, although some warranties, particularly those covering less mechanically complex products, last several years. Some go even further — Panamax, for example, provides a lifetime warranty on its entire line of surge protectors and offers free repair or replacement of any equipment that's damaged by surges while it's connected to a Panamax surge protector.

A warranty does not protect you if you buy the wrong product. If you can run the program on your computer, many manufacturers will insist that they have lived up to their end of the bargain. Even a buggy program isn't necessarily covered for replacement. When a warranty does cover a product's problem, you are usually financially responsible for delivering the merchandise to the factory for repairs or replacement, while the manufac-

overseas. The equipment itself may be fine, but the factory warranties are void in this country. Some gray-market dealers offer their own guarantees, but they're only as reliable as the retailers who back them up. How can you tell if a piece of equipment is being sold on the gray market? Federal law says you are entitled to read the warranty before you buy. If it's an original U.S. manufacturer's warranty, the product is probably not gray-market. But if it's only a store-backed warranty, it's a good bet that you may be buying gray-market equipment. Ask questions before you buy.

A used computer or discontinued model may be a good deal if you don't need all the speed, power, and memory of the newest model. But a machine that was state-of-the-art just a couple of years ago may not run today's more powerful software. More importantly, manufacturers may not supply replacement parts for discontinued models. Many manufacturers may not even be in business any longer.

For example, a writer I know wanted a Mac but couldn't afford a new one, so he bought a reconditioned Lisa from an out-of-state distributor. He loves it, but as far as Apple is concerned, the Lisa is history. He relies on the far-away retailer for replacement parts and on a local computer store where a technician happens to be familiar with the Lisa. If you're buying a used or discontinued model, decide whether you want to take chances. (As far as recently discontinued models, such as the Mac Plus, are concerned, Apple has said that as long as there's a demand and an installed user base, it will continue to provide service and support and develop software for these products.)

Basic common sense is your best resource, whether you're a first-time buyer or a seasoned consumer. By doing some research and knowing your rights, you'll end up getting the most for your money.

turer covers only the cost of return postage or delivery after repair. This should be stated in the warranty.

Few companies specify how quickly they will complete warranty repairs. Before you buy, try to find out how long you'll have to wait for a company to repair or replace a product. Also ask whether the manufacturer has a tracking system that gives you updates on the status of repairs. Even though a warranty might cover the cost of fixing your printer, having to wait three months for the repair to be completed renders the warranty practically useless.

Compare warranties when you're deciding among otherwise equivalent products. If a dealer makes any undocumented promises about a product's features, get them in writing. You might need this written evidence later for legal ammunition. If a product breaks down and your warranty has expired, be persistent. A sympathetic manufacturer might still replace your product for free.

Protect Your Investment

When you're buying hardware, the length of the warranty becomes especially important. Once you're no longer covered by the manufacturer's warranty, repairs and service can be both costly and inconvenient. Usually you can rely on a dealer for servicing on a time-and-materials basis, just as you might rely on a local mechanic to service your car; you're charged for labor, which typically ranges from $50 to $75 per hour, and the cost of materials.



You might consider buying an extended warranty that will cover you after the manufacturer's warranty has expired. In many cases, you're taking a gamble based on the hardware's reliability. Products, such as printers, that have several mechanical parts are more likely to break down than equipment, such as modems, that has few moving parts. Machines you use a lot or that you frequently move around, such as printers or portable hard drives, tend to break down more often than hardware that experiences less wear and tear.

You should consider purchasing an extended warranty especially if your equipment is protected by a short-term warranty. For example, in the case of equipment from major imagesetting companies that offer only 90-day warranties, such as Linotype and Agfa Compugraphic, extended warranties are almost a necessity. And if you can't afford to be without your hardware for any length of time, it's smart to invest in a service contract that makes provisions for loaner equipment for customers who are waiting for repairs.

Finding a Good Dealer

"Well, see, the drive on my IIci went out on me. I took it to my regular dealer, who immediately replaced the drive at no cost and then treated me to dinner and a movie before driving me home."

The above scenario is, of course, a complete fabrication. We're all looking for that Great Apple Dealer who can solve any problem quickly and effectively, with a smile and a hot towel. Some of us are even willing to settle for a place where we can explain a problem without having to rely on elaborate hand gestures ("It's grayish and round, you see, and has these little pins sticking up inside it").

Unfortunately, there's no surefire scheme for finding a good Apple dealer. There are some ways you can evaluate a local dealer, though, that will help you separate the Alpo from the prime rib.

Location. A shop within walking distance of a college is often your best choice. Students and faculty are a funky mix of different demands and problems, and it's here on the front lines where the truly great stores flourish and the bad ones go AWOL. Visit the stores on your state's border too — especially if the bordering state imposes no sales tax.

Stock. Any store can sell PageMaker, Excel, and MacWrite II. Good stores also sell more-esoteric software and hardware such as MIDI interfaces, programming languages, and Excel templates. And games. Somehow I can't trust a store that has a whole shelf full of WingZ but not one single copy of The Fool's Errand or Falcon.

A magazine rack is also desirable. I consider it a very healthy sign for a store to devote valuable floor space to $4 items such as *Dr. Dobb's Journal* and *MacTutor*.

Salespeople. One way to find out if you're dealing with a knowledgeable salesperson is to ask about the different virus killers in the Mac community. A salesperson who doesn't mention Disinfectant (a free virus killer that seems to be supported by the whole planet) is either pitifully lacking in knowledge or is intent on selling you a commercial utility. There's nothing wrong with recommending a commercial program, but completely ignoring a significant product such as Disinfectant is a warning sign that something's screwy.

You can gauge salespeople's depth of knowledge pretty easily. Ask them what the best spreadsheet or database program is. If the first response is "How much do you want to spend?" you may want to try another salesperson or another store. "Why do you want to buy a spreadsheet program?" is the most helpful thing good salespeople can ask; it shows that they're inclined to sell you the software that'll suit your needs, rather than the most expensive package you can afford.

Service. The best way to get an accurate feel for the quality of service you'll receive from a particular dealer is to wait for your equipment to fail (and you'd hardly get dizzy holding your breath waiting for that to happen, eh?). The second-best way is to ask around for opinions, especially at a user-group meeting. Expect a lot of recommendations of places to avoid — a poke in the eye is remembered far longer than a kiss on the cheek. Be aware, however, that these opinions may be somewhat loopy. Ask for specific examples of bad service and what the dealer did (or didn't do) to correct the problem.

You can also check out a service rep by asking a couple of strategic questions. Claim that you've lost the ball to your mouse. If the reps try to sell you a new mouse, run screaming for the car.

Companies with a heavy hardware investment should consider special maintenance options besides extended warranties. Here are some of the more common options for corporate Mac owners:

Manufacturer's contract. This type of extended warranty is expensive — about 10 to 15 percent of the hardware's original cost per year. AppleCare is a plan that covers the cost of parts and labor at any of 2,000 authorized Apple retailers nationwide. You can purchase the plan by the month for up to 36 months. For example, protecting a Mac SE costs about $21 a month; protecting a IIfx can cost up to about $75 a month.



The manufacturer's contract is more reliable than an individual dealer's, as the manufacturer is less likely to move or go out of business, but you should read contract conditions carefully. For example, AgfaCare is an extended warranty for purchasers of Agfa Compugraphic equipment. It promises you one free month of service if your broken machine is not running within 16 hours after a service representative arrives, but you will receive the free month of service only if you *renew* your service contract for another year.

Third-party maintenance. Some third-party repair services offer on-site repairs or loaner machines while you wait for off-site repairs. Their quality of service can vary, however, so check out credentials and ask for recommendations before entrusting them with your valuable equipment. Check out the charges carefully too. If your office isn't located near the repair service, find out if the company adds a "zone" charge, which can often range from $100 to $400.

Internal program. If you can't afford downtime and your company owns many computers and peripherals, you may want to hire an in-house technician specifically to maintain your hardware and software. In addition, save your outdated equipment and consider purchasing extra equipment to use as backups in an emergency.

Winning the Waiting Game

No matter how much preparation you put into choosing the right equipment or software, you rarely get instant gratification. You may wind up waiting a lot — for your product to arrive, for a company to return your phone call, or for repairs to be completed. After a while, you may get tired of the waiting game. At that point, it's time to consider some detours.

Know your consumer rights. If you haven't received your new product in a reasonable amount of time, you have certain rights guaranteed by law. According to the Federal Trade Commission, if a seller quotes a delivery date, you must receive your product by that date. If no date is quoted, the seller must ship the product within 30 days of the date of purchase or notify you in writing of the new delivery date. If you don't have the product or notification within 30 days, you have another 30 days to cancel the order; after canceling you should receive a full refund within 7 business days of the cancellation or, if you used your credit card, within the next billing cycle.

Make a lot of noise. If a company is not offering the help you want or a prompt, reasonable response to your complaint, be pushy. Companies are more likely to notice you if you demand attention.

Complain early and loudly. Write a short and civil letter to the president of the company; to ensure delivery, mark the envelope "Personal." Specify exactly what you want and when you expect to receive a response. One letter can have amazing effects; if it doesn't, write again and call. Document everything you do, and note whom you've spoken to. Keep warranty numbers and receipts.

Alert the public. Contact user groups, on-line services, and your friends and colleagues. Find out if others have had similar experiences, what they've done, and what satisfaction they've received.

Write letters. If the company advertises in a magazine,

If they try to get you a new ball, make them a nice plate of fudge brownies. A mouse ball is a notoriously hard item to find; a rep can order one, but it's a lot of trouble. You can also claim that your disk drive is sporadically asking you to format a perfectly good data disk. A good techie looks for small problems and asks if you've cleaned the drive's heads recently before trying to sell you a new drive.

Ask what happens when a piece of hardware breaks down. Do the dealers you're considering have an on-site service department, or do they just ship the unit back to the manufacturer? Also ask about warranty service. Believe it or not, there are some truly stellar service departments that simply swap your defective unit (if it's still under warranty, of course) for a brand-new one at no charge. This is going above and beyond the call, of course, but all dealers should be able to arrange service for everything they sell.

Don't forget to check the dealer's return policy. You should be able to return hardware (and sometimes software) for a complete refund within a certain period of time.

Prices. In my book, a fair price for a piece of hardware or software is about 10 percent more than what the mail-order companies charge. A store that charges $200 for a word processor that sells for $150 mail-order should sweeten the pot with superior support, such as tips and bug fixes, and cold compresses when you can't get the program to work.

User groups. I'm impressed by dealers who support their local user groups. Whether it's just a matter of allowing the groups to put up signs or actually lending them equipment for their meetings, these dealers usually prove worthy of their customers' patronage.

— Andy Ihnatko

write to the magazine. At *MacUser*, for example, we monitor complaints about advertisers and help consumers contact a company and resolve their problems. Send letters regarding *MacUser* advertisers to Telemarketing Assistant, *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

Contact consumer organizations. Depending on the severity of the problem, there are several organizations you can turn to for additional help. One of these is the Direct Marketing Association (DMA), a 3,500-member organization that attempts to resolve problems with mail-order firms. Send a copy of your receipt and a request for a complaint form to Mail Order Action Line, Direct Marketing Association, Six E. 43rd Street, New York, NY 10017.

Do the same with the Federal Trade Commission's Enforcement Division, which keeps track of complaints. Contact the Better Business Bureau (BBB) in your area. BBBs are funded by businesses for the purpose of self-regulation — they'll follow up complaints and provide mediation or arbitration if you want it.

Also contact the Chamber of Commerce in the company's city and the consumer-protection office in that state. Finally, if you're dealing with mail order, notify the postal-inspection division of your local post office, which can take civil action or refer the case to the U.S. attorney general for criminal action. If a company goes bankrupt, you can make a claim in federal bankruptcy court (see the "When a Company Goes Bankrupt" sidebar).

Happily Ever After

You've received your new hard drive or accounting package, and it's exactly what you wanted. That's great, but it's not the end of the story. Don't forget to send in the product's registration card. (But first make sure that you're happy with your purchase. If you decide to return the product, you'll usually need the complete package, including the registration form, in order to receive a refund or an exchange.)



There are several advantages to being a registered user. If the manufacturer finds a defect or produces an upgrade, you will usually be notified or the upgrade will be sent to you automatically. This kind of upgrade

Ten Questions to Ask a Mail-Order House

If you're willing to do a little research, you can purchase both software and hardware at a mail-order house at significant savings. The following questions will help you determine if a mail-order house is reliable. (Many of these questions apply to dealers too.)

1. Is the merchandise I want in stock now?

If it's not in stock, find out exactly when it will be shipped to you.

2. Are there various shipping methods from which to choose?

Check the cost and speed of each method. If you need same-day or next-day shipping, find out first what you'll be charged and what carrier will be used.

3. If I use a credit card, will the charges be applied to my account only when merchandise is actually shipped?

Don't take no for an answer: This is standard business practice.

4. How long has the company been in business?

Just because a company is young doesn't mean it's a fly-by-night organization. However, you should ask a few questions when dealing with a company for the first time — when did it start selling Mac products, for example, and can it give you references to contact. You can also leave a message on your local bulletin board or on Zmac asking other consumers for their experiences.

If you do get burned by a company, take advantage of organizations that protect consumers from illegitimate business practices. Call the attorney general's office of the state in which the company is located, the county consumer-fraud unit, the postal inspector, and the Better Business Bureau.

5. What's your return policy?

Look for mail-order houses that offer their own or third-party warranties as well as money-back guarantees or trade-in policies for customers who are not happy with their original purchase. Find out if you'll have to pay for shipping back a product that needs replacement or repair (this is a common practice). Avoid companies that charge an excessive fee (sometimes called a restocking fee) for returned products.

6. What is the average turnaround time on repairs or to receive a replacement?

This is an important question — that low-priced hard drive won't seem so cheap if you have to wait three months for it to be repaired.

7. What do repair policies include?

For example, when your hard drive is repaired, will the manufacturer help you recover lost data or does it only replace the drive? Will the company provide you with a loaner while you wait for repairs?

8. Is the price realistic?

Look through various advertisements to compare product prices. The two lowest prices you find should be similar. Confirm the price before ordering; many companies change prices without notice. Ask if there are additional charges such as a membership or service fee or if a surcharge is levied on credit-card purchases. Ask for a lower price; they can only say no.

9. Do you accept major credit cards?

Being able to pay by credit card offers you many advantages (see the "Tips for First-Time Buyers" sidebar). Credit cards can also push up a company's overhead costs, however, so some smaller companies may choose not to accept all credit cards.

10. Is there a toll-free technical-support line?

A toll-free tech-support number is convenient, but check it out. Call the number to verify that it exists, and ask during what hours help is available. Watch out for companies that have 900-prefix numbers for information or tech support. These calls aren't free — you're charged for each minute you're connected.

How to Read a Warranty

Most people don't read warranties. But if you want to be a smart consumer, you must change your ways — the warranty tells you how long and to what extent you and your purchase are protected. With Apple's standard one-year warranty as an example, here's a step-by-step guide to some of the baffling terminology that finds its way into consumer-product warranties.

A Limited Warranty

Almost all warranties are limited in some way, so you'll probably never come across a "full warranty." Time limitations, for example, vary according to the manufacturer's discretion; *limited warranty* might refer to a warranty that covers 5 years or one that protects you for 60 days.

B Defects

A defect is anything that prevents a product from working as the manufacturer says it will. A hardware defect protected by a warranty is clear-cut — your machine doesn't work, and it is fixed or replaced. Limited software warranties, however, often extend only to the medium itself and not to defects or quirks in the program — the manufacturer guarantees only that you'll get a disk with *something* on it. This isn't true of all manufacturers, however. Some guarantee that the software will meet the specifications laid out in the documentation. Such a guarantee will be stated in the warranty if it applies.

C Time Limit

Most warranties state the length of time they're good for, although manufacturers can extend warranties at their discretion. If your machinery breaks down after your warranty has expired, the manufacturer is under no legal obligation to repair it, unless, for example, you can prove there was a hidden defect before the warranty expired. However, some manufacturers require you to make any claims *within* a stated period. Be sure to read the warranty to see if this requirement applies to your merchandise.

D Proof of Purchase

Always keep all receipts for your purchases, but send only *copies* (not the originals) to the manufacturer.

E Express Warranty

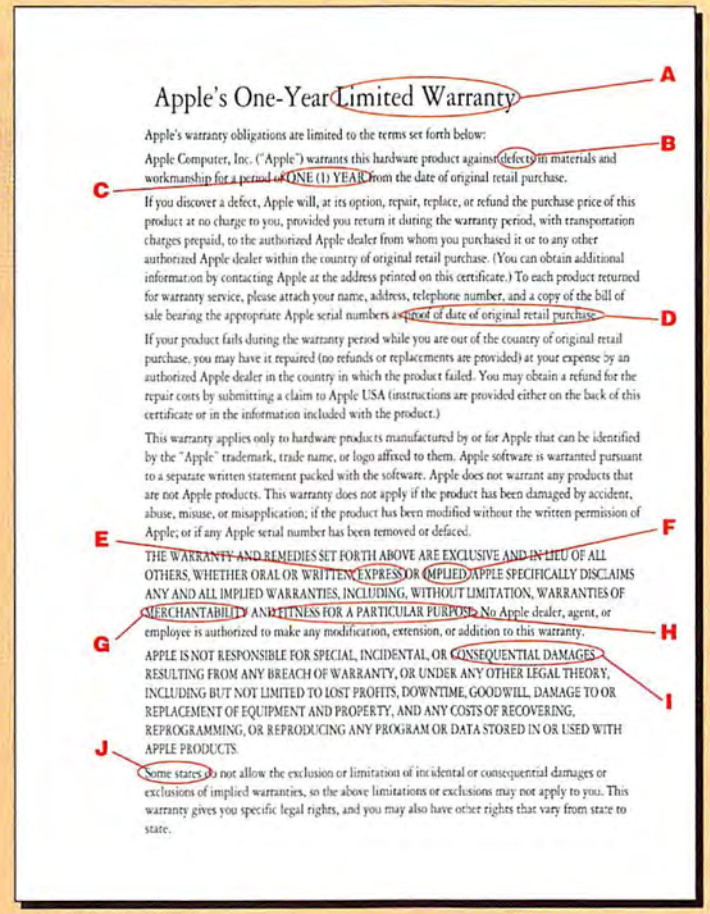
Sometimes a warranty mentions the Uniform Commercial Code (UCC), which requires sellers to stand behind their *express warranties*. It also creates certain *implied warranties* (see item F), unless a disclaimer is made (as in this warranty). All states except Louisiana have slightly changed and adopted the UCC.

According to the UCC, a seller creates an express warranty when he or she makes an affirmation of fact about a product's quality that might influence a buyer's purchasing decision. For example, if a dealer says that certain software will work with System 7.0 "or your money back," you can hold the dealer to those words. Whenever possible, get an express warranty in writing. That way, if a dispute arises, you can remind the dealer of what you were promised.

A retailer who uses a sample or model product to sell software or hardware is also creating an express warranty — a promise that what you buy will work as well as the sample or model did in the demonstration. Note that many manufacturers don't honor express warranties made by a dealer (as in this warranty), but the dealer is obliged to cover them.

F Implied Warranty

A sales transaction involves two important implied warranties, both upheld by the UCC: the implied warranty of merchantability and the implied warranty of fitness for a particular purpose. These are usually created by implication when software or hardware is sold, unless a disclaimer is made in the warranty, as in this case.



Apple's One-Year Limited Warranty

Apple's warranty obligations are limited to the terms set forth below:

Apple Computer, Inc. ("Apple") warrants this hardware product against defects in materials and workmanship for a period of ONE (1) YEAR from the date of original retail purchase.

If you discover a defect, Apple will, at its option, repair, replace, or refund the purchase price of this product at no charge to you, provided you return it during the warranty period, with transportation charges prepaid, to the authorized Apple dealer from whom you purchased it or to any other authorized Apple dealer within the country of original retail purchase. (You can obtain additional information by contacting Apple at the address printed on this certificate.) To each product returned for warranty service, please attach your name, address, telephone number, and a copy of the bill of sale bearing the appropriate Apple serial numbers as proof of date of original retail purchase.

If your product fails during the warranty period while you are out of the country of original retail purchase, you may have it repaired (no refunds or replacements are provided) at your expense by an authorized Apple dealer in the country in which the product failed. You may obtain a refund for the repair costs by submitting a claim to Apple USA (instructions are provided either on the back of this certificate or in the information included with the product.)

This warranty applies only to hardware products manufactured by or for Apple that can be identified by the "Apple" trademark, trade name, or logo affixed to them. Apple software is warranted pursuant to a separate written statement packed with the software. Apple does not warrant any products that are not Apple products. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication; if the product has been modified without the written permission of Apple; or if any Apple serial number has been removed or defaced.

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Some states do not allow the exclusion or limitation of incidental or consequential damages or exclusions of implied warranties, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

A B C D E F G H I J

G Implied Warranty of Merchantability

This promises that a product is what it says it is and that it will do what you expect it to do. For instance, if you buy a box of blank diskettes and you are unable to format most of them, then the implied warranty of merchantability has been broken.

H Implied Warranty of Fitness for a Particular Purpose

Unlike the implied warranty of merchantability, this warranty is not automatically created with a sale. It is usually created when a dealer assures you that a product will fit your particular needs. If this warranty is violated, you are entitled to claim damages under a breach of warranty (unless the manufacturer disclaims it in the product's warranty, as is the case here).

I Consequential Damages

If, for instance, a program destroys your entire hard drive and causes you to lose a month's worth of work, you may be able to claim consequential damages, in which case the manufacturer would pay you for lost profit and lost work time. Not surprisingly, most manufacturers attempt to limit their exposure to having to pay for consequential damages by using language such as that in this warranty. (These attempts don't always stand up in court, however.) Most states require manufacturers to compensate users for damages that cause personal injury — if equipment explodes, for example, or gives you an electric shock.

J State Rights

Although laws regarding remedies for consequential damages or breach of warranty are fairly uniform from state to state, they may vary somewhat. The law requires the manufacturer to point this out in the warranty.

policy is not uncommon with software and occasionally applies to hardware as well. For example, when Rodime discovered that the firmware in one of its drives prevented the drive from reading from or writing to certain portions of the disk, all registered owners received notices explaining the problem and offering replacement EPROM chips.



Some companies send mouse pads, bonus utilities and programs, or other freebies to registered owners. Other manufacturers mail out newsletters with tips on product use or offer discounts on new products. Even more important, many companies require that you register in order to receive technical phone support. Aldus, for example, offers 90 days of free technical support to registered customers.

Even if you do register, however, you may need to watch out for product updates or upgrades — not every company automatically provides you with information about them. Game companies, especially, wait for you to call them before sending you the latest information. To learn about updated products, you can call companies directly, read magazines such as *MacUser*, and check out on-line services.

Being a smart consumer is just a matter of following a few ground rules and doing some research. You can save time and avoid unnecessary hassles by knowing what you want, whom you're dealing with, and what you're entitled to.

Shelley Zulman, a *MacUser* intern and a junior at Yale University, uses her consumer wisdom to select her favorite pizza in New Haven, Connecticut.

When a Company Goes Bankrupt

Last year my hard-disk drive went belly up. Luckily, it was still under warranty, so I sent it back to the manufacturer (Jasmine Technologies) for repair. Unluckily, shortly after I sent it, the company filed for Chapter 11 bankruptcy protection and I, like many other people, was stuck without a hard drive. Through the trials and tribulations of trying to get either a drive or my money back, I learned a few things about dealing with companies going through financial difficulties.

Generally, insolvent companies declare either Chapter 7 or Chapter 11 bankruptcy. In Chapter 7, the company is sold or broken up to pay off the creditors. Chapter 11, on the other hand, allows the company some protection from its creditors while it is reorganized with a view to resuming business at a later date. When a manufacturer goes into Chapter 11, you have a limited number of options available to you. If you are lucky and have the "orphaned" piece of equipment in your possession, you may find that other companies will honor the service contract or you may be able to find spare parts by contacting user groups and on-line services. If, however, you have already paid for but have not yet received an item or if you are waiting for an item to be repaired and returned to you, you have three choices.

1. You can decide it's not worth the time and effort to try to get what's owed to you, so you write off the money you spent on the product.

2. You can go through the legal system as a creditor. The firm handling the bankruptcy procedure will send you documents outlining the steps you must take to file your claim. You can expect to get back as little as five cents on each dollar or as much as the item's full value, but be prepared to wait for your money.

3. You can do what I did: Try to make friends and influence people at the company so that you become more than just another name on a long list.

Before my drive broke, I had already been waiting for four months for an upgrade to it — then I found myself at the bottom of a long list of creditors. I had been calling technical support at Jasmine at least once a week for several months, even before the company declared Chapter 11. When I heard rumors that Chapter 11 was imminent, I started calling every other day. This personal contact served me well — I had a new drive a month after the company declared bankruptcy.

If you plan to make a pest of yourself, there are several things you should keep in mind:

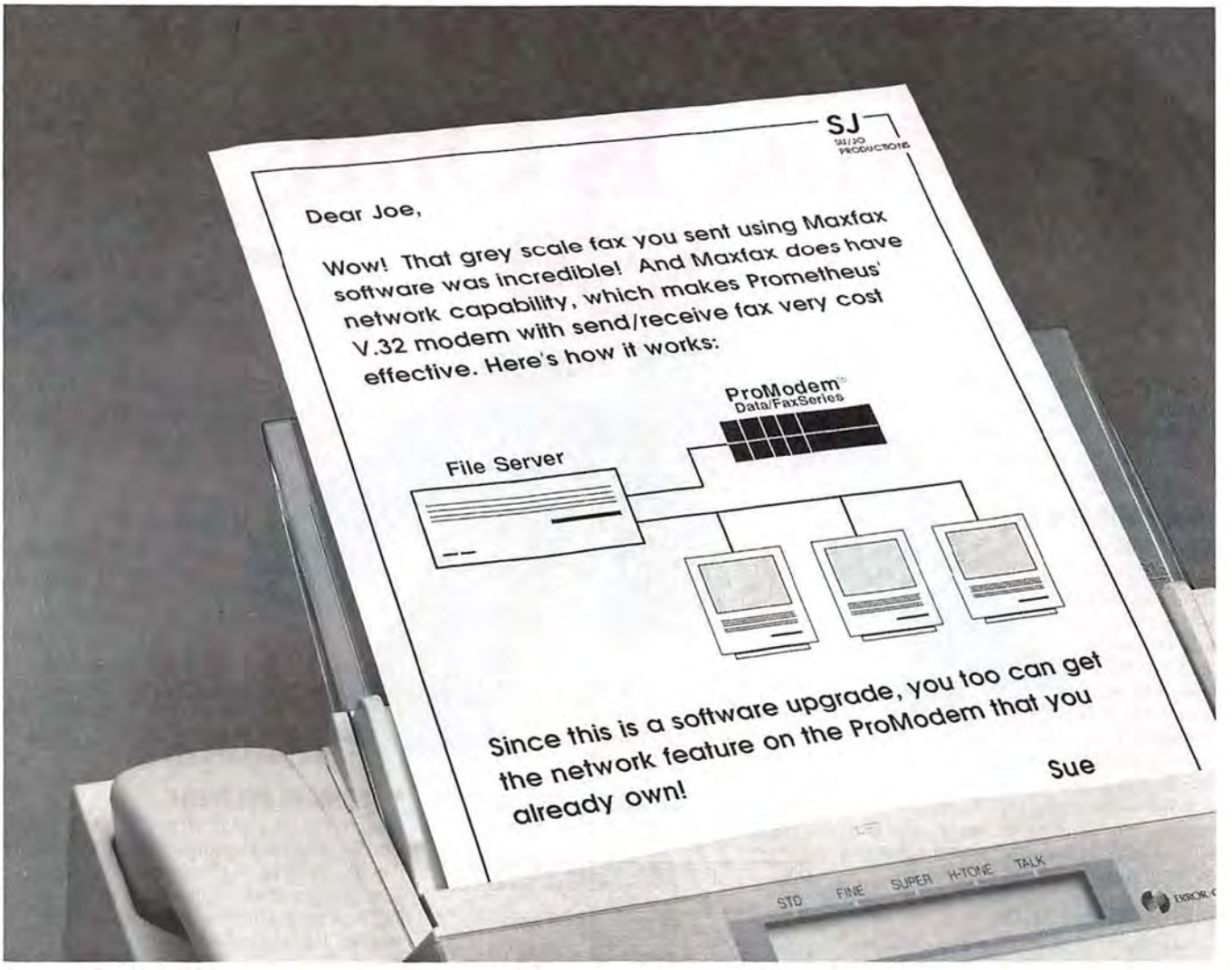
- Don't get angry. In most cases, the people you are talking to are not responsible for the current situation. They are probably overworked and in fear of losing their job and receive a lot of angry phone calls every day. The man I talked to at Jasmine repeatedly told me that he really wanted to help me, because I never yelled or got upset with him.
- Find someone who is actually in a position to help you. Getting names can be difficult, especially when employees are being laid off. Your best bet is to go straight to a supervisor or manager in the company's technical-support or customer-service department. You can get these peoples' names from an operator or receptionist. Make sure to get the phone extension of the person you want to contact so you can call directly.
- Be persistent — if your calls aren't being returned, leave lots of messages. I was constantly apologizing for calling so much, but that didn't stop me from continuing to call. Remember — you want to stand out from the crowd.
- Be willing to make compromises, and don't quibble over minor matters such as who pays for shipping. This should help hurry things along.

Regardless of how you decide to handle the situation, you will still be faced with the problem of operating without the equipment or software for what could be a long time. Usually you can find another brand of software that will serve your needs, but hardware can be more of a problem, especially if the equipment is something crucial such as a hard drive or printer. Always try to have a backup plan in place — ask if loaners are available before you return hardware for repair, and consider renting if it looks as if there might be long delays.

As a final note, don't give up hope until the company has completely folded. Jasmine is a case in point — the company reorganized and resumed shipping (and repairing) its hard drives in July 1990, four months after declaring Chapter 11.

— Margy Kuntz

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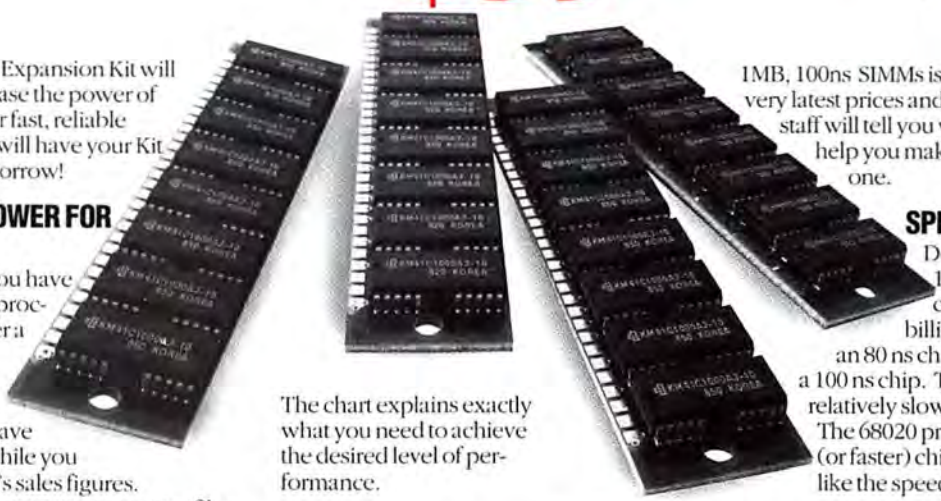
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The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory.	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.
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5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.
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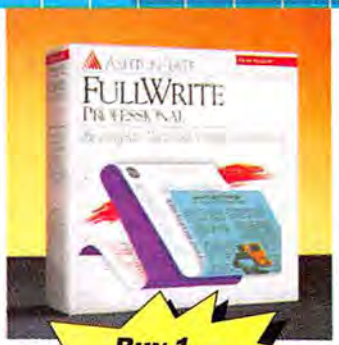
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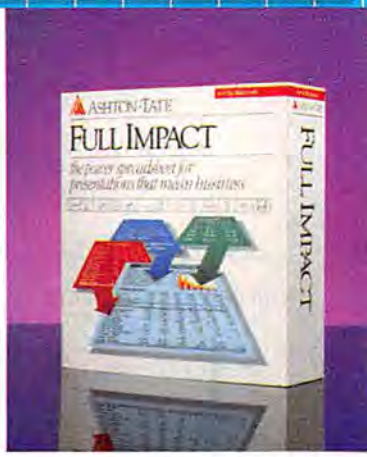
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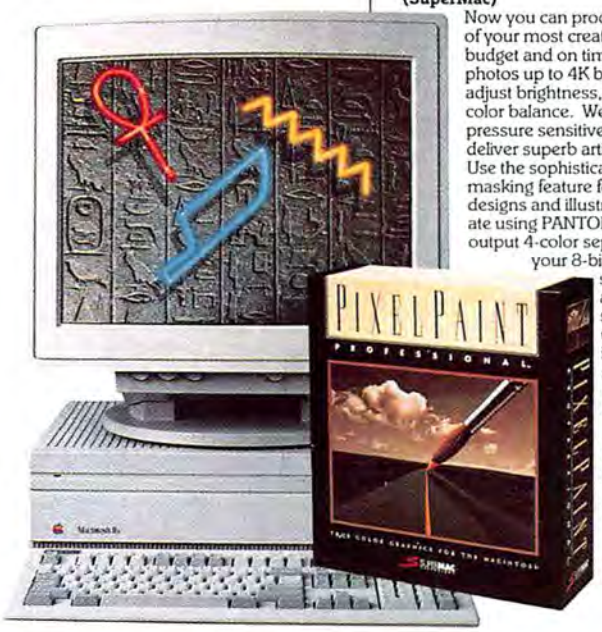
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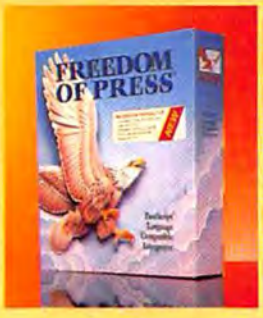


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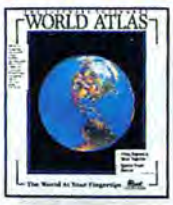
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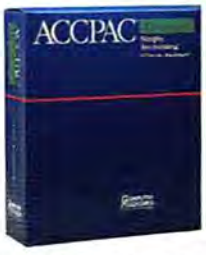
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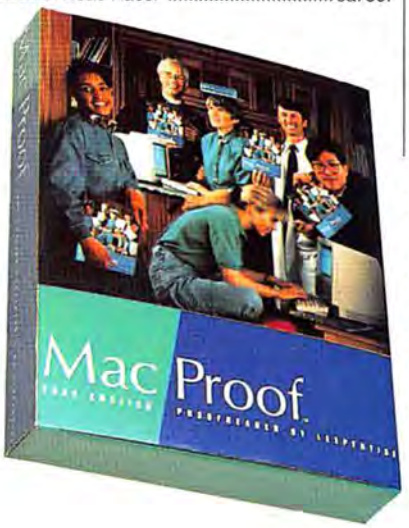
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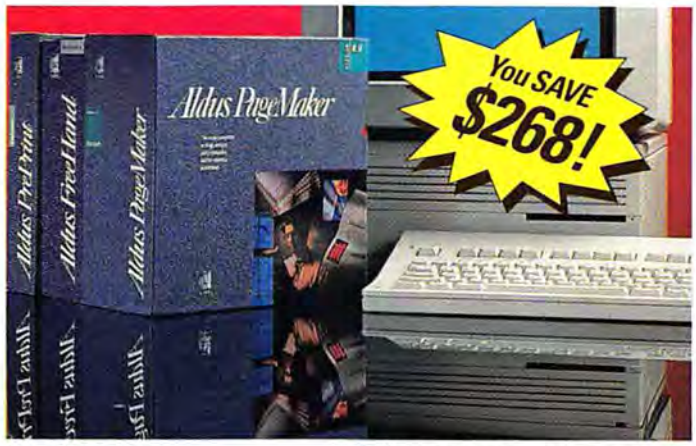
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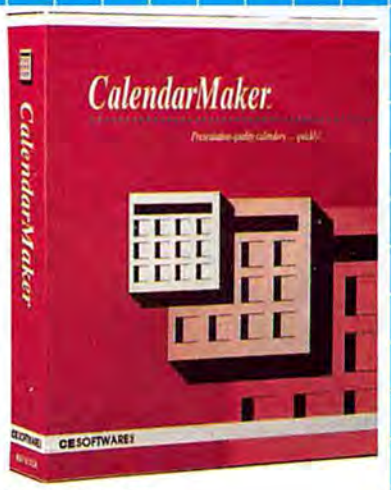
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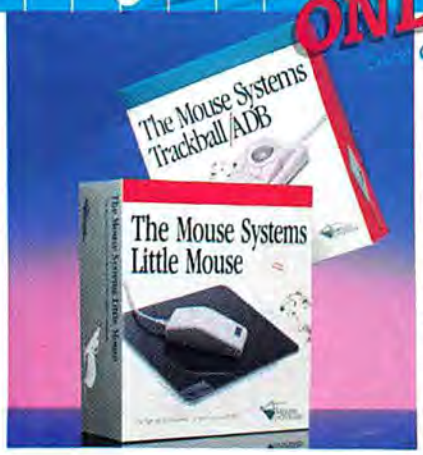
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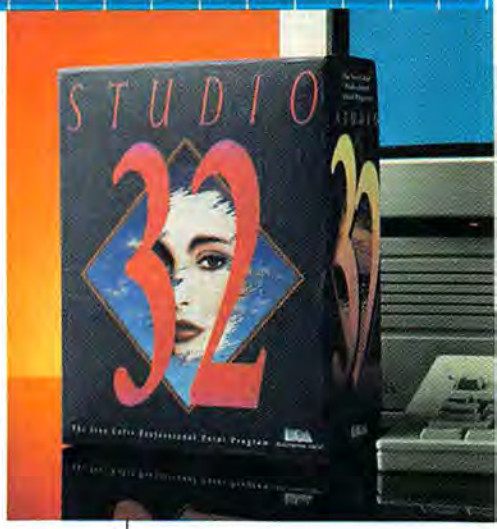


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Virex 59.
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Suitcase II 1.2 49.
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SuperSpool 5.0 58.
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AutoSave II 28.
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In the not-too-distant future, you may be able to move page-layout documents among rival programs and platforms. A consortium spearheaded by Quark and Atex is developing the Publishers Interchange Language (PIL), which conveys information about page geometry and content via ASCII files. This means, for example, you could create a document in PageMaker on an IBM PC and then open it in the Mac version of QuarkXPress. The initial release is scheduled for summer 1991.

By Aileen Abernathy

Whither TrueType? Apple and Adobe have finally kissed and made up, announcing a new licensing agreement and cooperation on future products. What does this mean for TrueType and TrueImage, the Apple/Microsoft alternatives to PostScript technology? ✣ Apple's TrueType outline-font technology probably won't be merged with Adobe's Type 1 format, at least not right away. Linotype, Bitstream, Monotype, and Agfa Compugraphic are still developing TrueType fonts, which should be released when System 7.0 ships in 1991. ✣ But Apple and Adobe will probably make every effort to ensure compatibility between the two technologies. This includes PostScript support in new Apple printers and TrueType compatibility in PostScript output devices and future versions of Adobe Type Manager. ✣ Microsoft is proceeding with its TrueImage PostScript clone, despite underwhelming consumer interest. The first TrueImage printers, from Microtek and LaserMAX, should ship in early 1991.

Expanding Quark: Hard on the heels of its success with QuarkXPress 3.0, Quark is squelching its reputation as a one-product, one-platform company. The company will release OS/2, Windows 3.0, and NeXT versions of QuarkXPress in 1991. ✣ And despite the failure of QuarkStyle (remember it?), Quark is again trying to broaden its product line, this time with QuarkLibraries, a series of EPS clip-art packages designed to work with QuarkXPress 3.0's library feature.



Poster-sized prints: The largest image created on the Mac (that I know of) is an 18-x-32-foot poster produced with PosterWorks (S.H. Pierce & Co.). Version 2.0 of PosterWorks lets users assemble photographic-quality color images containing multiple text and graphic elements and then send tiled output to any PostScript device. PosterWorks offers excellent control over color separations, and the output is impressive (see photo). ✣ For those who'd rather print their oversized art on a single sheet, the MegaChrome printing service can output color images of up to 42 inches by 12 feet in size. Developed by ReproCAD, MegaChrome is currently available at service bureaus in six cities. The 400-dpi EPS output can be produced in just a few hours and is perfect for maps, banners, signs, posters, and advertising comps. Cost is $12 per square foot; to find out the location of the nearest shop, call ReproCAD at (415) 284-0400.



Resources: *Verbum* magazine now has a series of instructional books that showcase the work of top designers and illustrators. The topics: PostScript illustration, page design, painting, typography, and scanned imagery (M&T Books, $29.95 each).

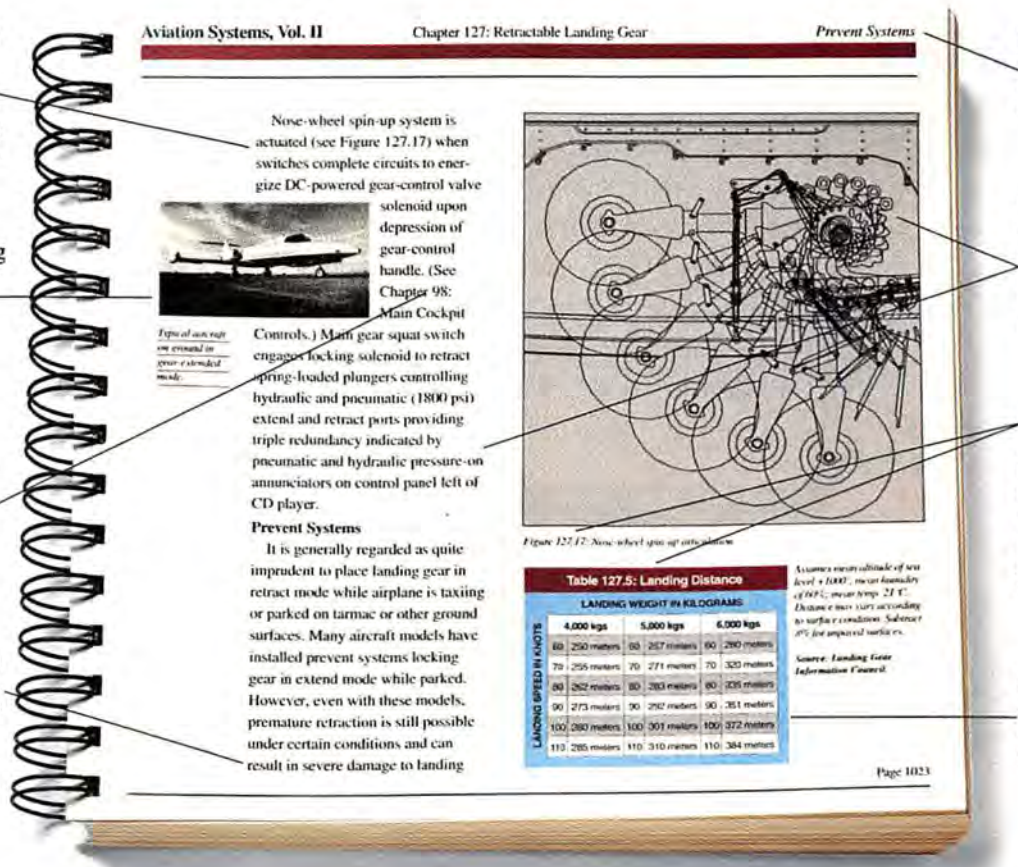
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Beyond the Laser Printer

An imagesetter does more than make your publications look professional. Understanding how this high-end printer works can save you time and tribulation, not to mention money.

By Kathleen Tinkel



Star Graphics in Foster City, California, provides high-quality output, using this Agfa Compugraphic imagesetter, which consists of a Max Plus RIP (left) and a ProSet 9800 recorder.

What on earth is there to know about imagesetters? They're just fancy printers that put a little more WYG into your WYSI, right?

Not exactly. If we call anything that produces paper or film from the Mac a printer, then an imagesetter is a printer — but what a printer! With its superior output and lofty price tag, this high-end machine is the Ferrari of electronic publishing. Imagesetters initially made PostScript irresistible to the publishing world. Then the PostScript/imagesetter duo redefined the typographer's job, and now it's on the threshold of doing the same for graphic designers, strippers, and other prepress professionals.

Imagesetter prices are dropping, quality is improving, and the variety of brands and models is growing at a healthy rate. We've come a long way since 1986, when the term *imagesetter* was so firmly attached to the Linotronic 100 and 300 that we were "going to Lino" when we sent a file for high-resolution output. Today Agfa Compugraphic is pressing hard on Linotype's heels, and other companies are jockeying close behind. Every wave of new machines brings more speed, higher resolution, and even better technical quality.

Unless you're a printing or prepress professional, you probably won't be buying an imagesetter any time soon. Even if you can justify the initial expense — which starts at around $30,000 and counts up by tens of thousands — running your own imaging system is unlikely to make you more productive. You're better off taking high-resolution work to service bureaus and letting *them*, not you or your employees, maintain the imagesetter's chemistry and supplies and train the master of all trades — stripper, printer, graphic artist, PostScript maven, computer whiz — who can get high-quality output out of these machines day in and day out. Then you won't have to troubleshoot the problems that crop up with every new customer and every minor software upgrade — problems that can easily turn a planned profit center into a dead loss.

Even as a service-bureau customer, however, you should learn something about how imagesetters work. Knowing what's possible (and what's not) will help you prepare files that print reliably. You'll have more control over the output and save time and money.

The Imagesetter Advantage

The imagesetter makes professional-caliber output available to anyone who can create a page on a computer. It can't magically turn you into a graphic designer or copywriter, of course, but your brochures, business forms, newsletters, and other work will look more professional if you output the camera-ready artwork on an imagesetter instead of on a

300-dpi laser printer. And just what *are* the major benefits of sending your work to an imagesetter?

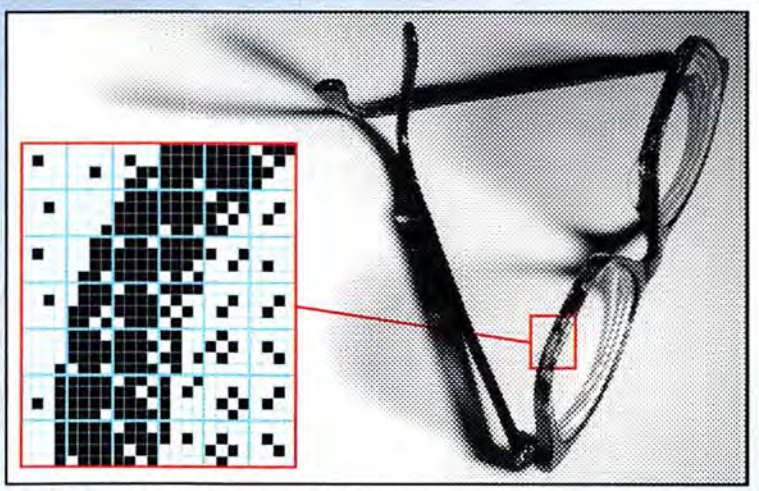
More Detail. Resolution is the primary reason for using an imagesetter instead of a laser printer. At a resolution of roughly 600 dpi — on an imagesetter, at least — the human eye stops discerning stair-stepping (a.k.a. the jaggies) in type and line art. At 1,200 dpi, most type is rendered well, although some typefaces with fine lines, tiny serifs, or subtle flares really require 2,400 dpi or more. The highest resolutions — 2,400, 3,000, and beyond — are most useful for typefaces with fine details; posters or other art that will be photographically enlarged; and jobs with screened solids, halftones, or separated full-color images — and then only when they are printed to standards that can exploit all of this detail (see the

Understanding Resolution

Simply put, resolution is the maximum number of dots that a device, such as an imagesetter or laser printer, can cram into a linear inch, and it is the key determinant of image sharpness. Resolution is measured in *dpi* (dots per inch), which could more descriptively be called *dpli* (dots per linear inch). A 300-dpi laser printer is capable of printing 90,000 (300 x 300) dots per square inch. Each dot is .0033 (a little over $^{3}/_{1,000}$) inch in diameter — yet you can see the dots with your naked eye. If you use a finer resolution, say 600 dpi, each dot will have a diameter of .0017 inches and a square inch will contain 360,000 of them. That's a 400-percent increase in the data that the printer must process. A 2,540-dpi imagesetter can output an astounding 6.4 *million* dots per square inch — no wonder printing times are longer!

Of course, you don't normally print every dot. If you did, you'd have a solid-black page. For type and line art, the printer or imagesetter plots dots only where black lines or characters should appear. For jobs with a range of grays, such as screens and halftones, the printer's dots are grouped into *cells*. For example, a cell might consist of 16 dots in a 4 x 4 array. Through dithering — turning various combinations of dots on (black) or off (white) — this cell could approximate 16 shades of gray (plus white).

Although *dpi* refers to the maximum resolution a printer or imagesetter can produce, *lpi* refers to the resolution you specify for printing a particular job on an offset press. The lpi (lines per inch) is also called the *line frequency* or *line screen*. If your job contains screens or halftones, ask the personnel at your printer ahead of time what line frequency to use and then specify that figure when outputting the document to an imagesetter or laser printer. (There's no need to specify a frequency for work that has only solid type and line art.) The printer's recommendation for frequency will reflect pragmatic factors — the quality of paper and ink, the size and sophistication of the printing press, and your budget for the job. Practically speaking, the normal range is from 85 lpi (for printing with web presses on newsprint) to 200 lpi (high-quality work on coated stock).



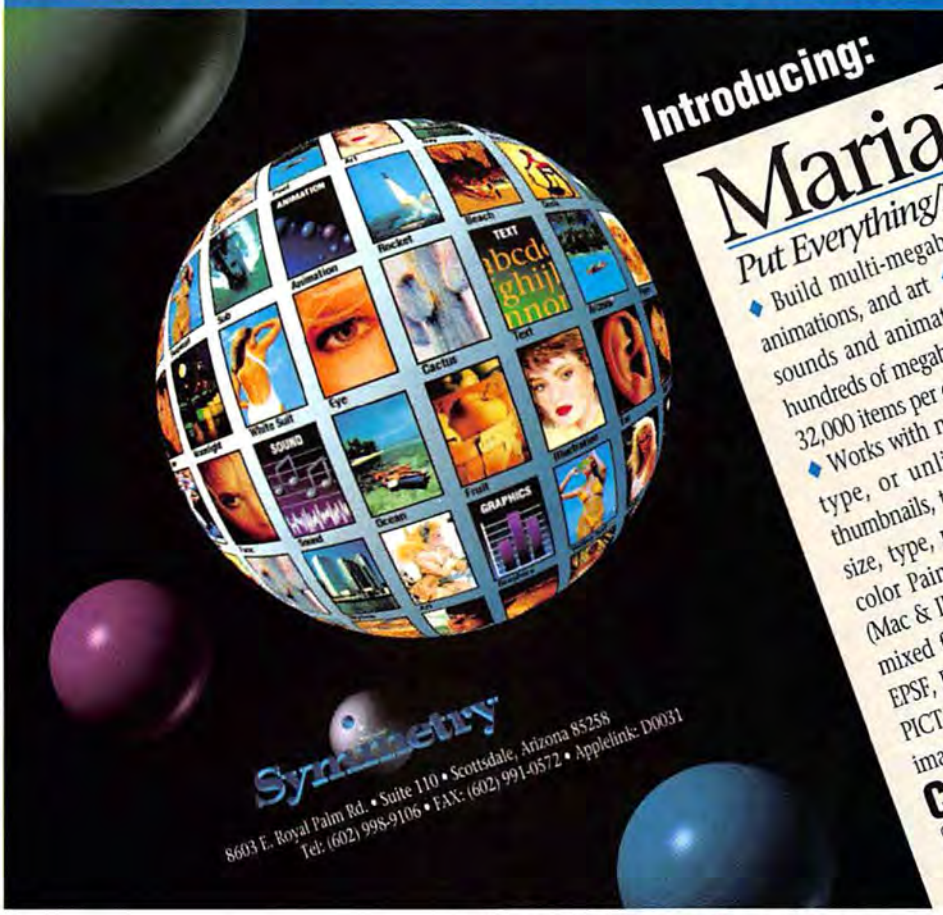
To print a gray-scale image, the printer's dots are grouped into halftone cells. This reduces the resolution, but by dithering dots, the printer simulates several levels of gray.

There's an unfortunate trade-off between resolution and gray levels, especially if you are sending output to a 300-dpi laser printer. The higher the output resolution (lpi), the fewer grays your image can have; conversely, increasing the number of grays forces down the resolution. Why is this? It happens because both resolution and gray levels are based on cell size. Smaller cells give you higher resolution and a sharper image, but you sacrifice gray levels, so images may display distinct banding. Larger cells can display more grays, but fewer of them fit into an inch, which means lower resolution and grainier images. To accurately reproduce a photograph, you need at least 256 grays, meaning a 16 x 16 cell. On a 2,540-dpi imagesetter, you can have both 256 grays *and* a resolution of 150 lpi; on a 300-dpi laser printer, however, the resolution drops to only 18 lpi — a blotchy, incoherent mess.

Knowing this relationship, you may be tempted to output your jobs on an imagesetter that offers the highest possible resolution — which could be as much as 4,000 dpi on the BirmySetter 350Z or 3,386 dpi on the Linotronic 330 — but try to resist the impulse. Remember that doubling the resolution (say, from 300 to 600 dpi) actually quadruples the number of data points that must be processed, and you may run into speed and/or memory limits that cost you money or halt the job altogether. In addition, PostScript supports only 256 gray levels, so if you print a job on a 2,540-dpi imagesetter, using a frequency of 150 lpi, you will still get only 256 gray levels.

Line frequencies have one other complication: The combination of the imagesetter's resolution (dpi) and the applied screen angle may prevent you from getting exactly the output resolution (lpi) that you specify. (To enhance the printed appearance, line screens are usually applied at an angle; the most common orientation is 45 degrees, which is the conventional angle for black or any color used alone.) At any given dpi, only certain combinations of line frequency and screen angle are possible. If you specify a line screen of 133 lpi and use a 45-degree angle, your actual output resolution will be about 120 lpi on a 2,540-dpi imagesetter and 130 lpi or so on a 1,270-dpi machine. A good service bureau is well aware of these limitations and should explain your options when you bring in the job. (For a complete explanation of cells, line frequency, screen angles, and halftones, see "A Touch of Gray," February '89, page 257.)

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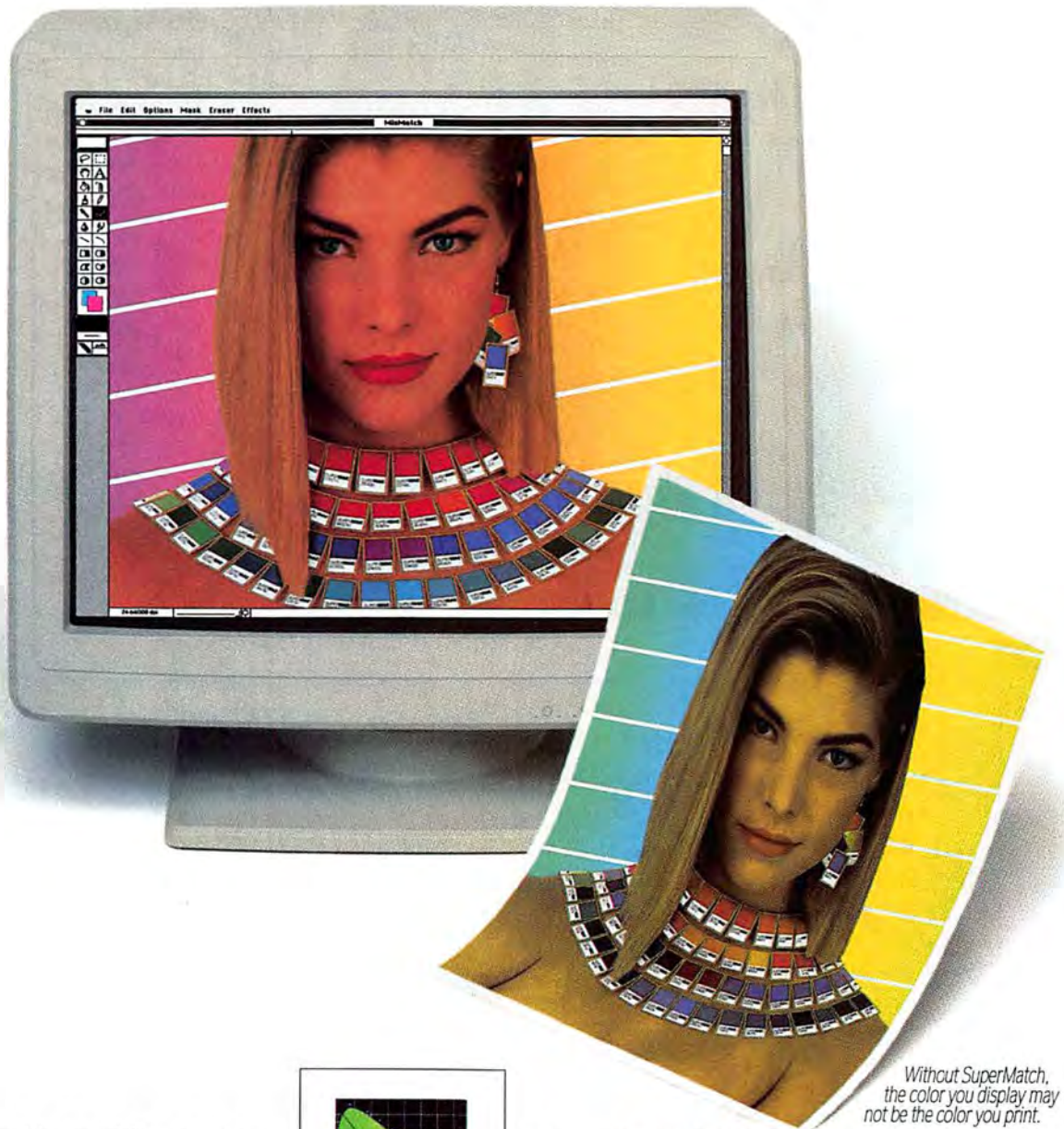


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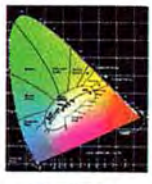
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"Understanding Resolution" sidebar).

More Control. Your Mac software gives you control over the page and graphic images, of course, but much of what you create may be lost at low resolutions. If you want to screen type or add screened panels that print behind type, for example, you're almost compelled to spring for an imagesetter job.

Better Time Management. By sending documents to a service bureau for output, you get them out of the way earlier in the production cycle. Your staff can focus on what it does best and leave the sometimes arcane process of producing PostScript output to specialists.

Accuracy. Accuracy is especially important any time one page has to match another — if you're bleeding graphics across a spread, for example. It's essential if you're doing color work, which requires precise image registration. The output from imagesetters is more stable than that of laser printers, for two reasons. First, photographic material — both RC (resin-coated) paper and film — is physically more stable than even the fanciest paper used in laser printers. It doesn't stretch as much while moving through the machine, it doesn't have to withstand the high temperatures that a laser printer puts out (which can also distort paper), and it's less likely to stretch and shrink with varying humidity. Second, the transport mechanism in imagesetters is designed to move paper and film more smoothly and precisely than that of laser printers, so that problems such as distorted type or graphics, banding, and misregistration are less likely.

Economy. A somewhat obscure advantage of the imagesetter's higher resolution (1,200 or so is sufficient) is that you can print small type and fine-lined artwork without sacrificing readability. Nine-point type fills in and becomes unreadable when printed at 300 dpi on a laser printer, but it is sharp and legible at 1,270 dpi on an imagesetter. For price lists, timetables, and other reference materials, this may save several pages — and it will almost certainly save you more than the relatively modest cost of high-resolution output.

Choosing a Service Bureau

By asking a few questions about its equipment and the services it offers, you can assess a service bureau's capabilities and expertise. Here are some suggested questions (and answers) to help you choose the best shop for your imagesetter work. (If you need a bureau for film output and/or color separations, see the questions in "Getting It on Film," May '90, page 351.)

Which Mac operating system are you using?

A well-run service bureau should have a full understanding of the Mac's operating system; its graphics file formats and foibles; and font management, with the attendant pitfalls (and solutions). At this writing, the answer should be System 6.04 and Laser Prep 6.01.

What kind of Mac setup do you have?

An output service doesn't have to have the latest Mac model, but you should be alarmed if it doesn't use at least a Mac II, because the shop presumably needs access to color and lots of memory.

The simplest way to get a MacIntosh into your Mac.



How new is your imagesetter?

Again, it's not necessary to have the newest and fastest imagesetting equipment for most routine work, but a place with outdated units is at a disadvantage. A good service bureau is likely to have a Linotronic 300 with a RIP 3, or an Agfa ProSet 9400 with a Max RIP. Anything older is likely to have imaging problems.

Can you output files from the four basic Mac graphics programs: PageMaker, QuarkXPress, Illustrator, and FreeHand?

Operators don't have to know all the tips and tricks, but they should have the most current versions (or subversions) of each program and know how to control details such as crop marks and the line frequency for screened work. They should also know when to use PrePrint, Separator, and other necessary programs.

What fonts do you have? Can you provide screen fonts for the typefaces in your library?

Most large service bureaus get the Adobe/Linotype fonts as they're issued and probably also have fonts from other vendors (Monotype, Bitstream, and The Font Company are the most common sources). If you are a regular customer with a healthy amount of output, most good service bureaus will buy the fonts you use if they don't already have them (but not for your first drop-in job).

How well do you know PostScript?

At the very least, an operator should be able to read PostScript well enough to do basic troubleshooting of jobs that are reluctant to print. It's an even better sign if the operator can write short PostScript routines to make up for software inadequacies.

Do you use a densitometer? How often?

A densitometer is an optical device that produces density readings from film. The service bureau should use it daily to check emulsion quality, particularly for halftone and color jobs. This is the only way to ensure the accuracy and consistency of grays and colors.

Do you offer film output on a regular basis?

Even if you don't send your output to film, this is a good question. One sign of a service bureau's excellence is its handling of film work, because film is used for more-demanding jobs (such as halftones and color work) and requires greater expertise. Also ask how often the shop processes film. Some service bureaus economize on processing equipment by outputting film only occasionally — say, one day a week. You're out of luck if you need film any other day. Occasional film output also suggests that the bureau doesn't do demanding work on a regular basis and may not be keeping up with changes in software and technology.

Do you guard against viruses?

Good hygiene is essential. The service bureau should check its equipment for viruses every day (with the latest version of an antiviral program) and have an isolated Mac for checking customer files before allowing them onto the network.

What's your procedure for accepting work?

The best service bureaus have an organized procedure for taking in work, such as a form that asks you to list all the necessary details of your job.

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What Is an Imagesetter, Anyway?

An imagesetter is a high-resolution output device that uses a laser beam to "paint" text and graphics onto photosensitive paper or film. The basic machinery consists of a PostScript RIP, or raster image processor (which can be software but is more often a piece of hardware), and the imagesetter itself, sometimes called a recorder or writing engine. The RIP translates the incoming PostScript file (usually sent from a Mac) into the pattern of dots that will be output. The recorder's laser beam then traces the image onto paper or film. (RC paper is generally used if the output is type and line art; transparent film is preferable for halftones and color work.) The exposed paper/film is then developed in a film processor to produce the finished page.

Imagesetters come in two basic formats. In the conventional two-box system — such as most models sold by Linotype and Agfa Compugraphic — the RIP and recorder are separate entities. The buyer chooses a RIP and a compatible recorder from a single manufacturer's line, generally paying more for faster RIPs and for recorders with higher resolution. There are also imagesetters, such as those in the BirmySetter line, that combine both recorder and RIP in a single box. In the past, these stand-alone models were slower, less precise, and less expensive than the two-box systems, and they were mainly used for outputting type and line art in low-volume settings such as design studios and ad agencies. However, now you can get more-capable stand-alone units, such as the Optronics ColorSetter 2000.

A year or two ago, many of Linotype's competitors used "clone" RIPs — that is, RIPs with a non-Adobe PostScript interpreter. The clone RIPS often had trouble outputting Adobe's encrypted Type 1 fonts, which could be properly interpreted only by Adobe PostScript RIPs. Then three things happened in rapid succession: Some clone manufacturers broke Adobe's font-encryption code; Adobe began licensing its font technology to competitors; and finally, Adobe published the specifications used to create Type 1 fonts. As a result, most of today's imagesetters — regardless of RIP — should have no problems with Adobe or other Type 1 fonts.

Most service bureaus have either a Linotronic 300 with a RIP 3 or an Agfa ProSet 9400 with a Max RIP. On a technical level, there are differences between these workhorse systems, but both handle the most common work — type with line art in one or two colors — with aplomb. Older imagesetters are still around, of course, but most serious service bureaus update their equipment to take advantage of advances in hardware or PostScript that bring more speed and higher image quality, better paper transport, and more precise calibration.

Working with Service Bureaus

As recently as 1988, sending files out for high-resolution output could be quite daunting, an adventure only for the very bold. But yesterday's problems — font-ID conflicts, slow imagesetters with insufficient memory, software whose files took hours to image (or, as with CricketDraw, wouldn't image at all), and

Imagesetter Vendors

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Agfa Compugraphic
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(508) 658-5600

Birmy Graphics
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Miami, FL 33242
(305) 633-5241

ECRM
554 Clark Road
Tewksbury, MA 01876
(508) 851-0207

Hell Graphic Systems
145 Pinelawn Road
Melville, NY 11747
(800) 955-4355
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Hyphen
187 Ballardvale Street
Wilmington, MA 01887
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service bureaus staffed by novice operators — have given way to technological advances and greater competence, even professionalism. Imagesetting hardware is much more powerful, and page-layout and graphics software works (for the most part) smoothly and capably. Today when you have problems with a font, bump into software or imagesetter limitations, or make a technical error, a good service-bureau operator will know how to output the job anyway, without much loss of time or great expense.

Whichever imagesetter a service bureau uses, the most important element to a customer will always be the operator. If you have specific technical requirements — for wider-than-normal pages, closely registered colors, or ultrahigh resolution — then, of course, you'll have to locate a service bureau that can provide those features. In most cases, however, your goal should be to find a place staffed by competent people you can work with, people who can help you learn to manage the technology (see the "Choosing a Service Bureau" sidebar).

At a recent symposium of output experts — people who manage the service bureaus that have been producing desktop color — a surprising fact emerged. The operators consider it *part of their job* to teach customers how to use the software and understand the technology. It's not altruism — the service bureaus will be much more efficient if they're not always recovering from the same errors. This also suggests an important consideration for users to keep in mind: If a service-bureau operator is going to be your teacher, make certain you find one who has something useful to teach you.

What about price? Although there is competition among service bureaus, be skeptical of places that offer drastic discounts for their output services — they may not have modern, well-maintained equipment or skilled personnel. Quality costs, and a service bureau must pay for its pricey equipment (which must be replaced when it becomes technically obsolete), maintenance and repairs, supplies such as film and chemicals, highly skilled labor, and waste disposal. A growing number of service bureaus charge by the running inch instead of the page, because imagesetters can produce odd-sized output, making the notion of "standard" pages obsolete. Today's imagesetters are faster and more capable, so you rarely run into time charges for slow-running graphics files unless you're outputting color separations or doing other processor-intensive work.

If you can't find a service bureau nearby that can handle your job, it's fairly easy to work with a remote bureau, and in some cases it may even be preferable. Regional and national service bureaus are appearing, in part because some work (especially color) demands a level of expertise that's not available in every metropolitan area. Sending your output to remote service bureaus is relatively easy, thanks to fax machines, fast modems (9,600 bps is becoming commonplace), portable high-density storage media such as the ubiquitous SyQuest drives, and reliable overnight-delivery services. Using a remote service bureau may even be less expensive than using a local bureau — current overnight- or two-day-express services

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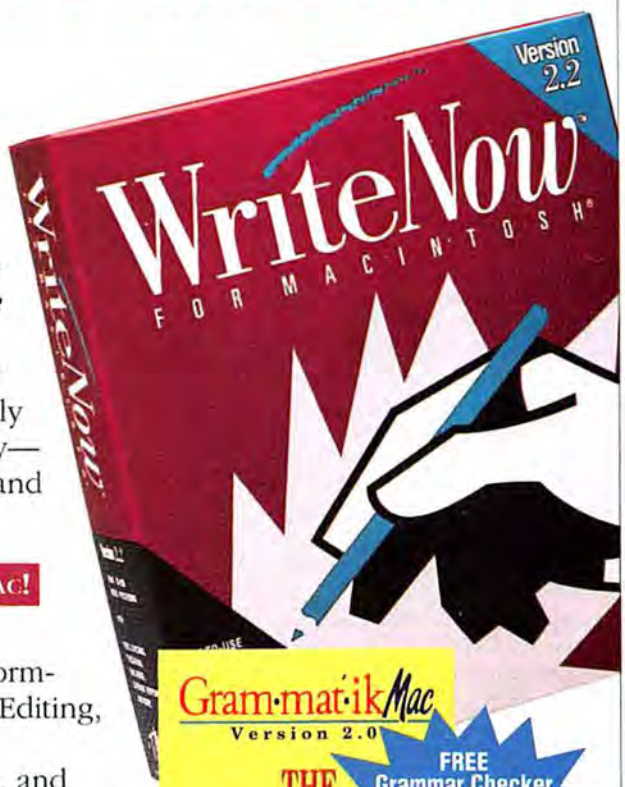


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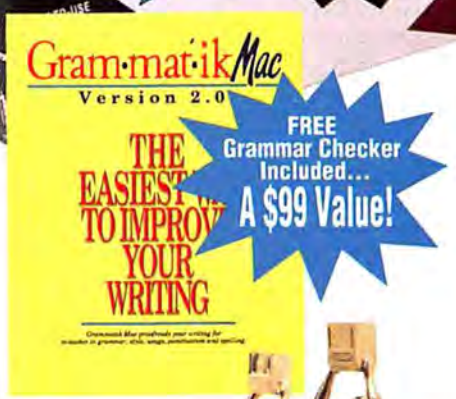
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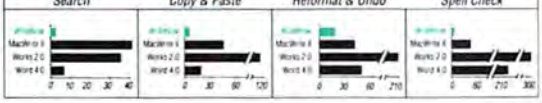
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Imagesetter Models

To give you a better understanding of imagesetters and their features, here's a brief look at the models you're most likely to encounter in a service bureau.

Linotype. Three years ago, there were two imagesetters on the market: the Linotronic 100 and 300, both from Linotype. Linotype has long since discontinued the L100, which was slow, was limited to 1,270-dpi resolution, and had so little memory that many files simply wouldn't print. (Linotype replaced the L100 with another low-end model, the L200, which is somewhat faster and has a maximum resolution of 1,693 dpi.) However, you can still find L100 machines in use, particularly in in-house typesetting facilities and at quick-print shops that do a little output on the side. Steer clear of these clunkers; because they're so inefficient to operate, you may, ironically, end up paying a premium, and they don't produce high-quality work.

The L300 is another story. Most service bureaus that use Linotronics are operating L300s, probably with a RIP 3 or the faster RIP 4. This workhorse unit offers a 2,540-dpi resolution and has the speed and quality to do almost any work that fits on a 12-inch-wide page. In fact, the L300 is being used by some skillful PostScript mavens to produce color separations, although that's stretching its capabilities a bit. In 1990, Linotype introduced an imagesetter optimized for color work, the L330, and the very fast RIP 30. The L330, which supports resolutions of up to 3,386 dpi, can be found in a few high-end color shops. Linotype also has two wide-paper models, the Linotronic 500 and 530, which can image 18-inch material.

Agfa Compugraphic. A year or two ago, Compugraphic sidled into the marketplace; by mid-1990 it seemed to be

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outselling Linotype on a month-to-month basis. The Agfa Compugraphic line of ProSet imagesetters offers excellent quality, high speed, and a slightly wider page than usual (13.3 inches). The company offers modular units; a buyer chooses one of the ProSet recorders, the 9400 or the 9800, with either a PS Max RIP or the new high-performance PS Max Plus RIP. Agfa also offers the SelectSet 5000, which is designed specifically for high-end color work. It incorporates Adobe's speedy Emerald RIP, which is based on a RISC processor and can print tabloid-sized pages. In addition, Agfa has a new low-end model, the compact and relatively inexpensive StudioSet 2000.

Varityper. Although its imagesetters seem to be selling slowly, Varityper offers an unusual feature of interest to service bureaus: a memory buffer that enables its 5300, 5330, and 5500 models to re-image a page without running it through the RIP again. The 5500 model is limited to 1,016 dpi but accepts material up to 18 inches wide; the 5300 model goes up to 2,400 dpi and the 5330 machine to 3,048 dpi.

Other Vendors. Several other companies — including Birmy, ECRM, Hell, Hyphen, Monotype, and Optronics — also market imagesetters. You may not find these machines at service bureaus, but if you're considering buying an in-house system, they're good candidates.

Birmy Graphics sells several models of its modestly priced BirmySetter. Birmy's older PostScript-clone units, based on the UltreSetter recorder, were reliable workhorses for type and line work. Its newer models have a faster Adobe PostScript RIP. BirmySetters offer resolutions of up to 3,000 dpi; the newest model, the 350Z, is based on the Holotek recorder and offers software-selectable resolutions of up to 4,000 dpi. Birmy also plans to market an imagesetter that uses Adobe's superfast Emerald RIP.

Monotype seems to be focusing primarily on the newspaper market with its fast, 1,200-dpi ExpressMaster 1200, which can handle 18-inch material. The company also offers a standalone unit, the Prism PS Plus, for black-and-white work and has announced an Adobe Emerald-based RIP, the PS4000.

The Optronics ColorSetter 2000 has a non-Adobe RISC-based RIP and produces resolutions of up to 2,000 dpi on 20-inch-wide material. Optimized for color work, the ColorSetter can be slow and cumbersome but is very accurate.

Hell, which supplies its UltreSetter recorder to several other vendors, has recently introduced BridgIt, its own Ultre-based stand-alone imagesetter. BridgIt is targeted at design studios, ad agencies, and other low-volume black-and-white sites.

Plain-Paper Imagesetters. Finally, there are several plain-paper "imagesetters" on the market. These are essentially laser printers with resolutions of 600 dpi or higher. This particular category is getting crowded — vendors see an opportunity to upgrade office laser

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printers to near-typeset-quality output — but for the most part, you probably won't find these printers at service bureaus. Most of the major vendors (Linotype and Varityper, for example) offer a plain-paper model, as do several other companies. LaserMAX sells the LaserMAX 1000 Personal Typesetter, which provides 1,000-dpi resolution, as well as a controller board that can convert an Apple LaserWriter to 800 dpi. Printware markets a 1,200-dpi laser printer, the 720 IQ.

Although the cited resolutions of plain-paper machines seem comparable to those of film-producing imagesetters, they are actually visibly coarser. This is due in large part to the nature of toner. It's hard to control precisely where toner falls and how large the dots become when the toner is heat-fused (that is, melted) to the paper. Plain paper is also less stable than photographic media, so registration and page-matching are difficult. Finally, some of the PostScript-clone models — such as the LaserMAX — have compatibility problems with Type 1 fonts or with the Mac itself.

Special Needs

If your work involves many halftones, complex EPS graphics, or full-color images, you should look for a service bureau with newer, faster, more powerful equipment. This can include Linotype imagesetters with model numbers ending in 30 (the L330 or L530, especially) operated with the fast RIP 30, or an Agfa ProSet imagesetter with the PS Max Plus RIP. Systems that use Adobe's new Emerald RIP should also offer the required power.

If you need to output color separations, the Linotronic 330, the Agfa SelectSet 5000 or ProSet 9800, and the Optronics ColorSetter 2000 are designed specifically for this purpose. For large newspaper- or poster-sized pages, locate a service bureau that offers output on 15-, 18-, or 20-inch-wide media. Either of the Monotype ExpressMaster imagesetters will fill the bill (although they're rarely found in service bureaus), as will the Linotronic 530, Agfa SelectSet 5000, Varityper 5500, Optronics ColorSetter 2000, or a Hyphen system based on the ECRM PelBox 108s recorder.

Finally, for high-quality output of delicate or subtle typefaces such as Optima, especially at sizes below 6 points, look for an imagesetter with ultrahigh resolution (3,000 dpi or more). The Linotronic 300, Varityper 5330, BirmySetter 300 or 350 (the latter is not yet shipping), and Hyphen UltreSetter-based models all offer these high resolutions.

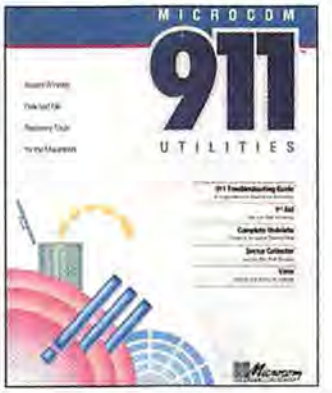
Imagesetters are becoming more capable with every new product release from Adobe and the hardware vendors. In fact, they're almost keeping pace with graphics and page-layout software and our expanding appetite for imaging power. Even if you don't intend to buy one of these amazing machines, to know them is to make the most of them in your attempts to produce complex graphics and color work from the desktop.

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- ***1st Aid™*** *recovers data from damaged disks and files.*
- ***Complete Undelete™*** *tracks and recovers deleted files.*
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Complex Graphics

You can greatly simplify the creation of a complex graphic by using multiple drawing layers.

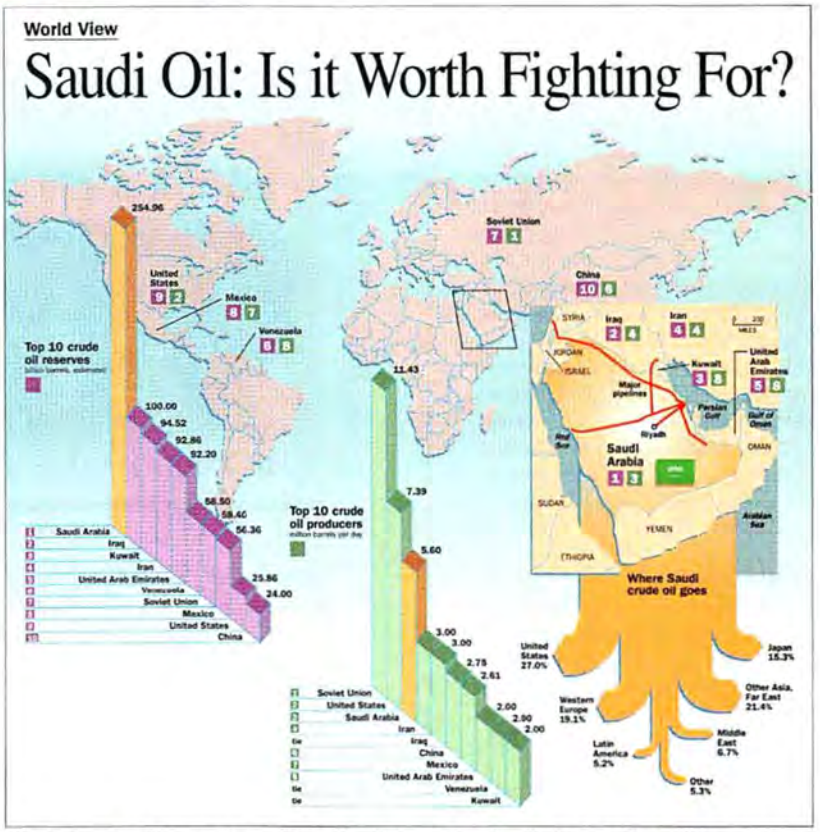
By the editors of *Verbum* magazine

A sophisticated graphic may have numerous elements: backgrounds, objects, shadows, masks, text, and so forth. This complexity can make it hard to work with selected elements, can lengthen screen redraw times, and can create output problems. You should be able to minimize these frustrations by using a program that provides multiple drawing layers.

At the *Los Angeles Times*, illustrator Juan Thomassie relies on FreeHand's layering function to produce detailed infographics quickly and accurately. Assigning graphic elements to their own layers helps manage the object order (which elements are in front, which in back) and lets elements be worked on independently. Each layer (or range of layers) can be made active (editable) or inactive. Inactive layers are invisible, which eliminates selection and redraw hassles. Using layers also may help documents print faster and with fewer PostScript errors. Other programs that let you use layers — such as Canvas, SuperPaint, Dreams, and MacDraw — offer similar functionality.

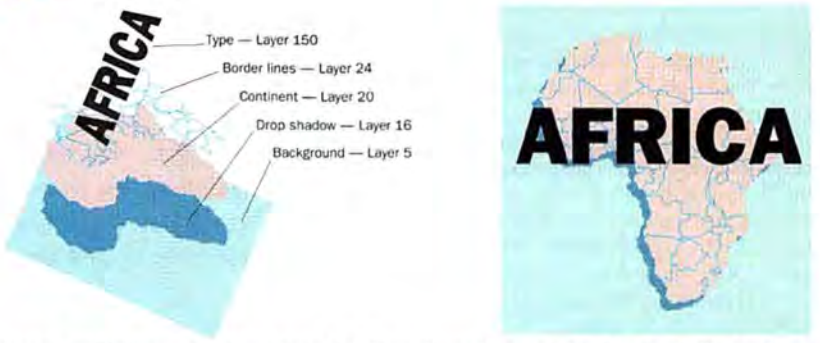
***Verbum: The Journal of Personal Computer Aesthetics* can be reached at Box 15439, San Diego, CA 92115.**

1 The Finished Infographic



Illustrator Juan Thomassie used FreeHand's layers to simplify the creation of this complex but coherent infographic, which appeared in the *Los Angeles Times* on August 14, 1990.

2 Using Layers



Layers act like transparent overlays. You draw elements on individual layers (left), and the completed "stack" of layers creates the finished graphic (right). Each object is opaque, so elements placed in front (at the top of a stack) obscure whatever lies behind them. Thomassie used FreeHand's 200 drawing layers to organize his infographic. For example, he placed all the text in layer 150 to ensure that the type would always overprint other graphic elements.

3 Creating the Map



A basic world map is hand-traced from a reference atlas, scanned, and opened in FreeHand as a template. The outlines of continents and islands are drawn as closed shapes and assigned to layers 20 (Western Hemisphere) and 22 (Eastern). The interior borders are drawn as open-ended lines and assigned to layers 24 (Eastern) and 26 (Western). This organization makes it easy to select and color different elements.

4 Adding Depth and Color



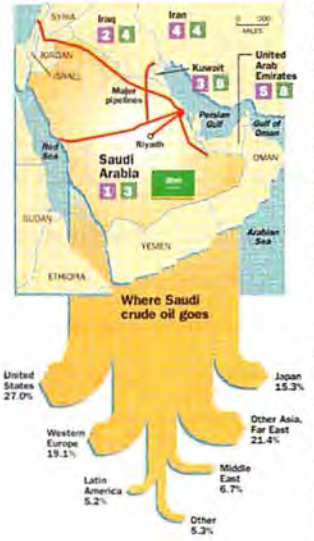
With FreeHand's Layer Control, layers 20 through 22 are made active. The continent and island shapes in these layers are selected and colored with a light-gray fill and no outline.The resulting gray shapes are cloned and filled with blue, offset a few points to the bottom, and sent to layer 16 to create drop shadows. Next, layers 24 and 26 are selected, and the interior-border lines are styled as 0.5-point blue lines.

5 Creating a Background



The ocean area, which serves as a unifying background for the graphic, is composed of three separate filled areas: a center rectangle filled with solid blue, a top rectangle with a logarithmic fill graduating from blue up to white, and a bottom rectangle that changes from blue to white in a linear gradation. A logarithmic fill produces a more rapid fade than does a linear fill, and thus it provides a larger area of white at the top of the background to set off the black headline. The rectangles are styled with no outline so that the colors blend seamlessly where the top and bottom gradations touch the solid fill. Then they are sent to layers 5 through 7, near the bottom of the layer hierarchy.

6 Highlighting a Region



The world map is too coarse to be used for details, so a separate map of the Persian Gulf is hand-traced, scanned, auto-traced, and finally pasted into layers 38 through 58 of the original map document. To highlight Saudi Arabia, its borders are drawn as a single closed shape and colored with a radial fill. A multipointed arrow placed in layer 40 slips between the inset's ocean background and the land areas. Drop shadows are added to the arrow and country shapes with the technique described in Figure 3.

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True Color Calibrator Display System™



ROSES ARE X=0.7344, Y=0.2656; VIOLETS ARE X=0.1566, Y=0.0177.

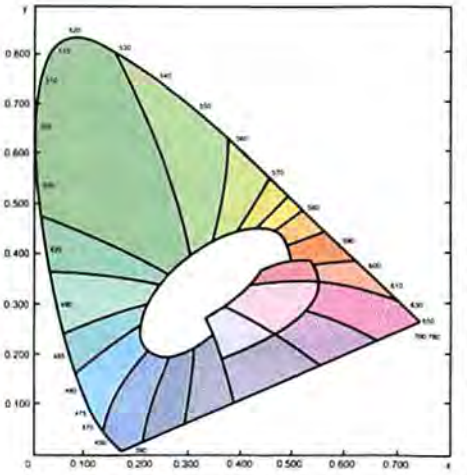
Owing to variations in human perception, color, like beauty, is very much in the eye of the beholder. This being true, if we want to communicate accurately about color, we need to convert the language of art into something considerably more objective and exact: the language of science.

Some time ago, an international scientific team developed a mathematically reliable color system, known as CIE. This model is the basis for the new RasterOps® True Color Calibrator Display System.™

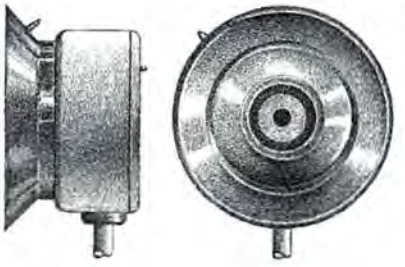
Due to temperature, humidity, and as yet-imperfect CRT technology, even the best and brightest display colors

can drift and fade over time. To compensate, the True Color Calibrator display has a built-in microprocessor which monitors performance on a continual basis and corrects instabilities with its own internal calibration routines.

This self-calibration is performed automatically, *75 times a second* — well before the sharpest eyes would detect any variation in color. The net result is that roses and violets on a True Color Calibrator display will always remain true to their mathematically-defined color values. Whether three minutes, three days, or three months from now. And the system has a communication port which can send these scientifically precise formulas to other monitors and printers.



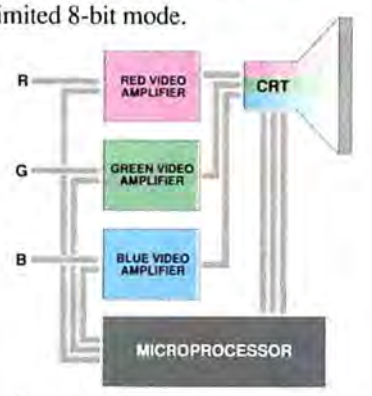
The True Color Calibrator is based upon the CIE model which mathematically defines all available natural colors.



Unlike other optical sensors, RasterOps' Optisense is thermally stabilized to insure consistently accurate measurements.

The True Color Calibrator also comes with an Optisense® optical sensor which, used just once a month, adjusts the system's self-calibration scheme for the inevitable aging of screen phosphors.

The makers of other calibration systems may make a big to-do about the optical sensor they provide. This is understandable, since that's all they provide. With no microprocessor in their display, they cannot offer automatic, continual calibration. The moment you remove the sensor, colors begin to drift and fade all over again. Which means their system is only as accurate as the number of times *per day* you stop and use the sensor. What's more, they recommend that calibration be performed only while in the more limited 8-bit mode.



Only the True Color Calibrator has a built-in microprocessor which continually recalibrates the display—75 times per second.

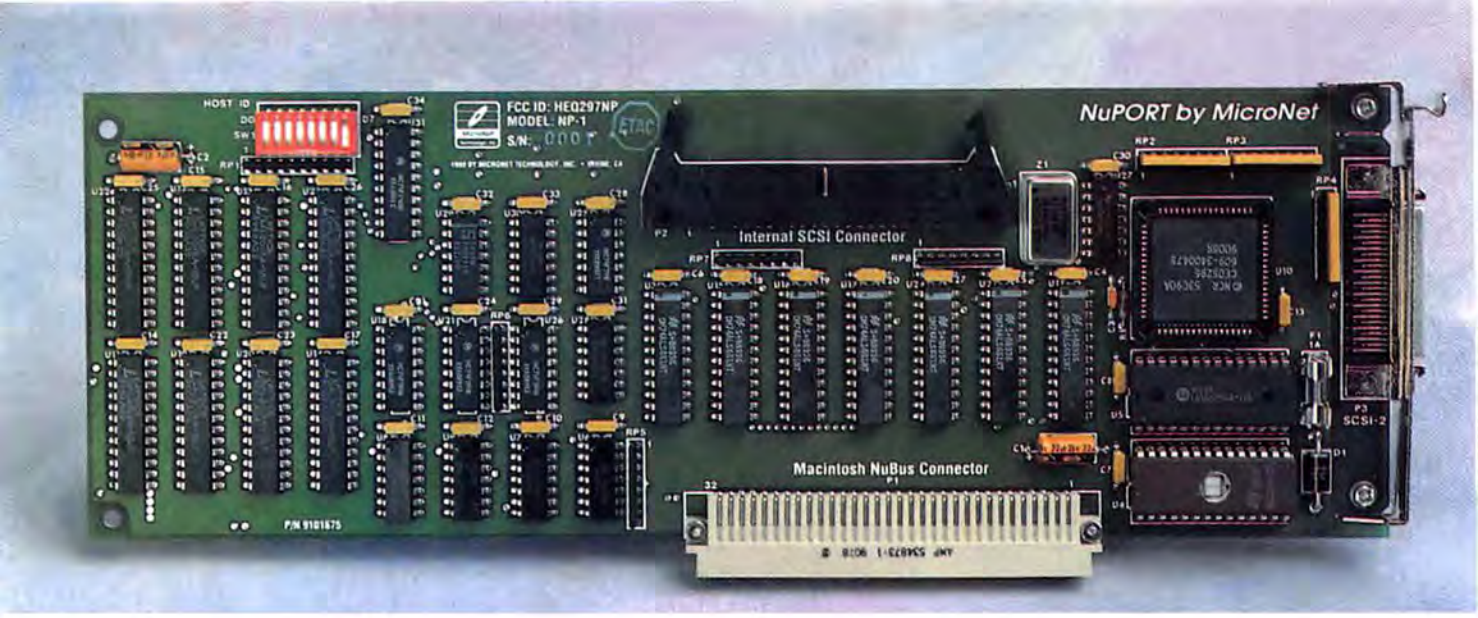
In deciding which calibration solution is in fact the most effective, it might be helpful to know that the world's most sophisticated electronic pre-press systems use the same microprocessor-controlled calibration we do. And further, that *MacUser* has hailed the RasterOps True Color Calibrator as "the most sophisticated monitor ever built".

If your application calls for a truly stable and precise color environment, your best call would be to a RasterOps dealer. Or you can phone 800.468.7600 to find out more about the True Color Calibrator from RasterOps. The people who've got the art of color down to a science.

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Time to Load a 30 MB Color File	0:11	0:33	0:37
Suggested Retail Price	*$600	$1295	$1495
True NuBus Bootable Device	Yes	No	No
Disables Built-in SCSI Port	No	Yes	Yes
Multiple Macintosh Support	Yes	No	No
Supports SCSI-2 and 16 Bit SCSI	Yes	No	No
Synchronous Data Transfers	Yes	No	No
Supports Transfers to 4.4 MBytes/s	Yes	No	No
Includes Hard Disk Utility Software	Yes	No	No
On-Board DMA Support	Yes	Yes	No
Shipped With a Matched Hard Disk	Yes	No	No
System 7.0 Compatible	Yes	Yes	Yes
A/UX 2.0 Hard Disk Partitioning	Yes	No	No
Supports Spliced/Overlapped Seeks	Yes	No	No
Supports Synchronized Spindles	Yes	No	No

NuPORT is Sold Only With Matched Hard Disk Drives.

*Additional cost when added with specific MicroNet hard disk subsystems.

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Mac users want file servers to look and act like AppleShare servers. Data shared by UNIX workstations are typically stored on NFS (Network File System) servers. NFS servers don't behave like AppleShare servers. But now, with Wollongong's new PathWay Client NFS for Macintosh, they do. With the Client NFS INIT in your System Folder, NFS servers appear in the Chooser and mount on the desktop just as any other AppleShare server does. $195 per node; bulk discounts available.

By Henry Bortman

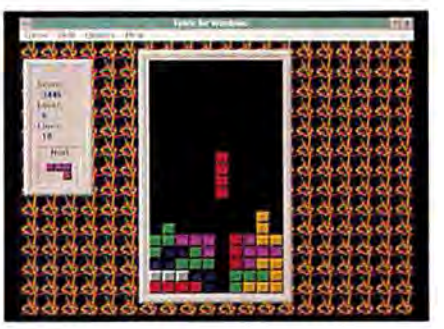
Incoming in box: Nearly two years after acquiring the InBox electronic-mail system from Symantec, Sitka (formerly TOPS [formerly Sun (formerly TOPS)]) has reshaped the product into the most flexible cross-platform mail solution available in today's desktop market. By the time you read this, InBox will be the only electronic-mail application that not only provides client software for both Mac and PC users but also allows users to install and administer an E-mail server on either a Mac or a PC. Remote access and send-and-receive fax capability will be included as part of the InBox 3.0 package. Gateways to other mail systems (VMSmail, X.400, SMTP, and MHS — but not QuickMail and Microsoft Mail) will be available from third parties.

Sun also rises: A SPARCstation running NeWSprint software can turn a serially connected printer into a network device. NeWSprint uses the computing power of the SPARC CPU to image PostScript-based documents faster, Sun claims, than the controllers in most of today's dedicated PostScript printers. Sun is also offering a SPARCprinter, a 300-to-400-dpi 12-page-per-minute laser printer. But, like Freedom of Press on the Mac (see review, January '90, page 77), NeWSprint works with printers from a dozen leading printer vendors, including Canon, HP, and Epson.

Interpersonal computing: Buzzword for the 90s? Xerox is buzzing about GlobalView, a networked multitasking environment with an emphasis on sharable documents that reside on servers. Innovative features include a "portable desktop" — you log on to the network from any participating workstation, and up pops your own personal desktop, complete with unanswered E-mail. Xerox previously offered GlobalView only on its proprietary 6085 and 8010 workstations. Now it's ported the software to a SPARCstation-IPC-based workstation, the Xerox 6520 (the software *does* run on other SPARCstations). And Xerox has put its 6085 CPU on a coprocessor card that runs alongside OS/2 in an Intel machine, turning it into a GlobalView workstation. Keep an eye on this. The engineers at Xerox PARC know what they're doing, even if their marketing department doesn't.



Who says DOS can't be fun? Microsoft is shipping — ready? — an Entertainment Pack for Windows. Seven games, $39.95. "Although the primary benefit [sic] . . . of the Entertainment Pack is fun, it can also help new Windows users get comfortable with the Windows environment." Is it that uncomfortable?



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Network by Design

Many Mac networks are plug and play, but efficient ones are planned.

By Kurt VanderSluis

"Back to the drawing board." That's what you say when your ideas don't work quite as you expected them to. For a lot of network managers, however, there is no drawing board — just a hodgepodge of local decisions that are not part of any long-range plan or design.

If that's the case for you as a network manager, it's time to build a drawing board and create a design. Besides being a reference point for your network, a design is a convenient way to communicate to others — wiring technicians, users, managers, assistants, and vendor's tech-support people — what you're

Physical Layer



Wiring Issues
What kind of wire?
What kind of wall outlet?
Where is the termination (outlet or connector)?
How many users per outlet?
How are users added?

Hub Issues
How many branches per port?
How many nodes per branch?
How is wiring documented?
Who is allowed to make changes?

Router Issues
How many routers?
What are the network-numbering conventions?
What are the zone-name conventions?
How is a router added?

Ethernet Issues
What protocols are allowed or supported?
How is trouble detected and corrected?
How are devices added?

Services



Network Printer Issues
How many printers per user?
What are the naming conventions?
How are consumables handled?
How is casual maintenance handled?

File/Mail-Server Issues
How many users per server?
Where are the servers located in the internet?
How is the configuration changed?
How is the server backed up?

Host-Access Issues
What are the access methods?
What are the query languages?
What are the client/server relationships?

Personnel



Wiring Technician
How are changes accomplished?
How are guidelines communicated?
Who documents wiring?

Network Manager
What are the boundaries of responsibilities?
How may users per network manager?
How are changes effected?

User
What is the trouble-reporting procedure?
Who does technical support?
What kind of reference materials are there?
Who does software upgrades?

Figure 1: When designing a network, three areas must be considered to prevent confusion later. Ignoring them can lead to confusion after the network is set up.

doing. Being able to say "This is how my network is built" allows you to share your vision and plans with others in an efficient manner.

Let's say that you have wiring technicians who perform their work inside the communications closet. They have to make many decisions when they do this: How many devices can be on one port of a star hub, how many devices can be in a LocalTalk network, and which ports should have what devices. Left on their own, wiring technicians will make it up as they go along. Maybe you'll end up with something you can make sense of later — maybe you won't.

When you set a definition of how to wire a star hub, the wiring technicians proceed according to an orderly plan. When you specify what is acceptable and what is not acceptable, you stay in control of how the network is built. If there are problems in some aspect of the system, you can change the definition of what is acceptable. If that doesn't work, keep changing the definition until you arrive at a design that works. But without a design — even a bad one — there's nothing to improve on; you're just taking more shots in the dark.

There are other benefits of planning. When you have a design for building a LocalTalk work group, for example, you can build several work groups, using the same guidelines. There's no reason to make up a different way of wiring for each work group when you can just make one design and replicate it. You also cut down on troubleshooting time. It's easy to spot trouble in a system when the system is orderly and you have a detailed understanding of how it's built.

More often than not, creating an AppleTalk network has meant approaching design casually. In medium-sized and large companies, the computing and networking staffs typically ignore AppleTalk networks. AppleTalk managers do whatever is most expedient and then try to stay out of the way. They also don't coordinate with each other, leaving later integraters the task of connecting vastly dissimilar AppleTalk networks. Connecting networks of VAXes, mainframes, and PCs is hard enough without learning to connect to AppleTalk more than once.

AppleTalk networks in small companies also often aren't fully designed. Often the person who builds the network isn't a full-time computer person and just does the installations and wiring as needed. A network of three Macs and a LaserWriter doesn't need much of a design, but when the network starts growing, the practices you've established for building and caring for the network can soon become obsolete.

AppleTalk network managers have tended to take a casual approach to design, but it's time to put those days behind us, to be accountable to the people we work with, and to be specific about how we build our systems. *We* benefit from planning as much as the people we work with do.

Put some "Multi" in your Finder !

One could have expected something called "MultiFinder" to find things in multiple ways. After all, using conventional card catalogs, public libraries have always offered mutiple ways to locate documents (by author, title, or subject).

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10BaseT technology can turn your telephone lines into a high speed, easy-to-maintain Ethernet network.



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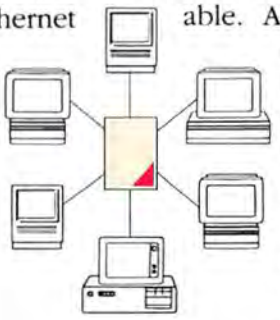


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Guide to the Print Dialog Box

As printing from a Macintosh has grown increasingly complicated, so have the Print dialog boxes that applications present to users. Here's how to handle almost any option a dialog box might throw at you.

By Craig Danuloff

Apple's standard Print dialog box hasn't changed much over the past few years, making it unrepresentative of the Print dialog boxes in most of today's Mac applications. To show the many options you're likely to encounter in current Print dialog boxes, here's a fictional dialog box (see Figure 1). This fictional Print dialog box comprises a main dialog box and two subsidiary dialog boxes that you access through dialog-box buttons.

The dialog box documented here was created primarily as a demonstration tool, but it also illustrates the need for Apple to provide more printing options for Mac applications. In 1991 the output needs of Mac users are far more complex than they were in 1985, and yet the LaserWriter Print dialog box has hardly changed since its introduction. This has forced nearly every software developer to modify the Print dialog box, leaving Mac users to face a different dialog box in every application.

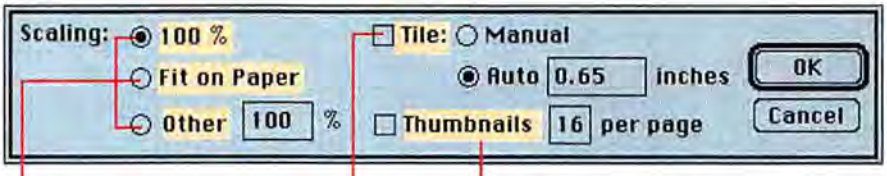
Although not every option in this sample Print dialog box is appropriate for every application, the need for a consistent interface does not necessarily need to bow to the lowest common denominator. The benefits of Print-dialog-box standardization might override the negative aspects of standardizing on a full-featured dialog box.

● **Copies:** The Copies option lets you specify how many copies of each page (usually up to 999) you want to print. Although the basic use of this option is obvious, in most cases it's faster and cheaper to reproduce quantities greater than 10 by using a photocopy machine rather than your laser printer.

● **Collate:** When you're printing more than one copy, the Collate option lets you specify whether the pages of each copy will be printed in order (1, 2, 3, 4, . . .) or if all copies of page 1 should be printed before all copies of page 2 and so on. Although choosing the Collate option saves you some manual effort, it forces your printer to image each page once for each printed copy, thereby substantially increasing the time it takes to complete the print job. For this reason, use the Collate option only when you're printing pages that don't contain any downloadable fonts or large graphics.

● **Page Range and Sections:** Although the traditional Page Range option lets you specify printed pages by page number, the addition of the Sections option provides control of the increasing number of word processors and page-layout programs that support multiple sections within a single document.

Figure 2



● **Tile:** Tiling lets you break pages that are larger than the current paper size across multiple sheets of paper. You can then glue or tape these separate sheets together to create a full-sized image. There are two tiling modes: Manual and Auto. Manual tiling requires you to specify the break for each page by manipulating some type of page-break option on the electronic page. Auto-tiling eliminates this task, automatically breaking your page into segments that fit onto the current paper size.

● **100%, Fit on Paper, and Other:** These options let you print the current file at its normal size (100 percent) or at any enlargement or reduction percentage from 25 percent to 999 percent. The Fit on Paper option automatically calculates the reduction needed to fit each page on one sheet of the current paper. It offers only automatic reductions, not automatic enlargements.

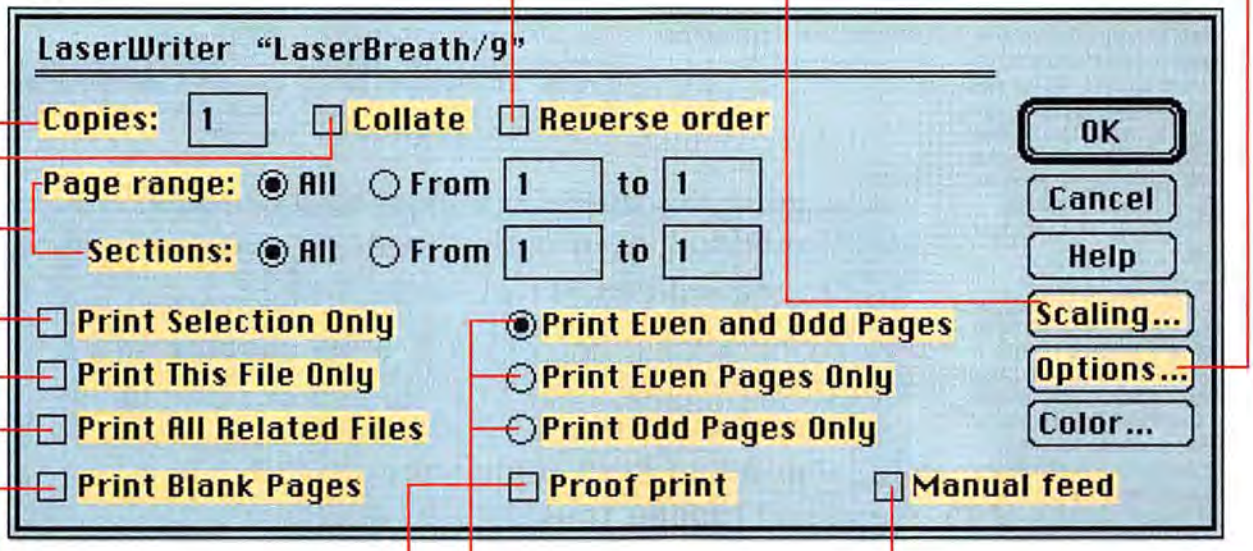
● **Thumbnails:** The Thumbnails option produces pages containing miniature versions of several pages from your file on a single sheet of paper. This is useful for looking at the overall layout of your file, although it is also useful as a way to create a paper record of the contents of a file without keeping a complete printout. You specify how many miniature pages should be placed on each page. In some applications, the size of the miniature pages is determined by the number of pages that are put onto each piece of paper, whereas other applications use a single size for the reduced pages, regardless of how many are included.

● **Reverse Order:** The Reverse Order option ensures that single or collated copies are placed in the correct page order on printers that normally stack pages with the last page first. Very few printers (the original LaserWriter is one) are designed this way, so most users rarely need this option.

● **Scaling options:** Several options affect the size at which images or pages are printed. To access these Scaling options (see Figure 2) in our fictional dialog box, you would click on the Scaling button in the main Print dialog box.

● **Options options:** A variety of options have become common in Print dialog boxes. These are included in the Options dialog box, which you access by clicking on the Options button in the main Print dialog box.

Figure 1



● **Print Selection Only:** The Print Selection Only option limits the printing to only the text and/or graphic elements that are selected (highlighted) when you choose the Print command. Although this option is becoming common in text-based applications, it is equally useful in graphic applications, where printing times are generally longer and so limiting the print range can produce faster output.

● **Print This File Only and Print All Related Files:** The Print This File Only and Print All Related Files options recognize that an increasing number of Macintosh files are created as part of larger publications and that it is therefore convenient to have the option of either printing all related files together (all the chapters of a book, for example) or specifically limiting the printing to only the current file.

● **Print Blank Pages:** The Print Blank Pages option solves a common problem by specifying that blank pages not be printed unless this option is selected.

● **Print Even and Odd Pages, Print Even Pages Only, and Print Odd Pages Only:** These options make it possible to print only even- or odd-numbered pages from the current page range. Many Mac users think of these options as only the first step toward the option they really want to see — one that would let you print a series of nonsequential pages (for instance, print pages 2, 5, 14–19, and 24).

● **Proof Print:** In the course of creating any type of word-processing or page-layout file, you often print draft after draft in order to read the latest version of your document's text. In most cases, you don't review the graphics included in your files along with each draft — yet they account for most of the time these files take to print. By using the Proof Print option, you can replace the graphics in your draft prints with a simple box. When it's time for the final print, you simply deselect the Proof Print option and your graphics reappear at full resolution.

● **Manual Feed:** On many laser printers, if you want to use the manual-feed paper tray, you must select the Manual Feed option in the Print dialog box. This isn't true of the Apple LaserWriter II printer, however, which automatically takes paper from the manual-feed tray if it's present. Using the Manual Feed option with LaserWriter II printers eliminates the need to race to the printer to put your letterhead into the manual-feed tray before paper from the normal tray is used — the LaserWriter II waits for you to place paper in the manual-feed tray.

● **Include Crop Marks:** When you select this option, a variety of markings appear in the area just outside your printed page. Standard crop marks are useful, because they let you accurately trim a page that is printed on a larger paper size. When you're printing color separations, most applications add several extra crop marks, including the name of each separation page, and registration marks.

● **Smooth Bit Maps:** This option improves the resolution of 72-dpi bit-mapped images by algorithmically adding bits from the laser printer's 300-dpi matrix to smooth out the rough edges that result from printing a 72-dpi image on a 300-dpi printer. This has no effect on EPS, PICT, or TIFF graphics or on PostScript or bit-mapped fonts.

● **Download Prep Temporarily:** To print most PostScript files on PostScript printers, a dictionary file (such as Laser Prep or Aldus Prep) must first be downloaded to the printer to define shorthand comments in the PostScript file sent during printing. These prep files usually remain in the printer's memory until you reboot the printer, so they do not permanently consume printer RAM.

● **Print Hidden Text:** Hidden text, as supported in Microsoft Word, is a special text style that you can toggle on and off for both display and printing. In other applications, the equivalent of hidden text can be used as electronic notes and can be displayed or hidden, both on-screen and on paper. This option controls the inclusion of hidden text in printed files.

● **Cover Page:** When you share a busy laser printer over an AppleTalk network, a confusing stack of pages can quickly build up in the printer's output tray. Selecting the Cover Page option adds a page at the start or end of each print job, listing the Chooser name, publication title, and printing date and time for each job. Cover pages make it easy for output pages to be correctly distributed.

● **Substitute Fonts:** When the LaserWriter was first introduced, many documents sent to the printer contained the basic nonlaser fonts New York, Geneva, and Monaco. To improve the quality at which these documents printed, Apple made it possible to substitute Times for New York, Helvetica for Geneva, and Courier for Monaco. This option is still available in many Print dialog boxes and still has the same effect. Unless the document being printed contains New York, Geneva, or Monaco, the Substitute Fonts option does nothing.

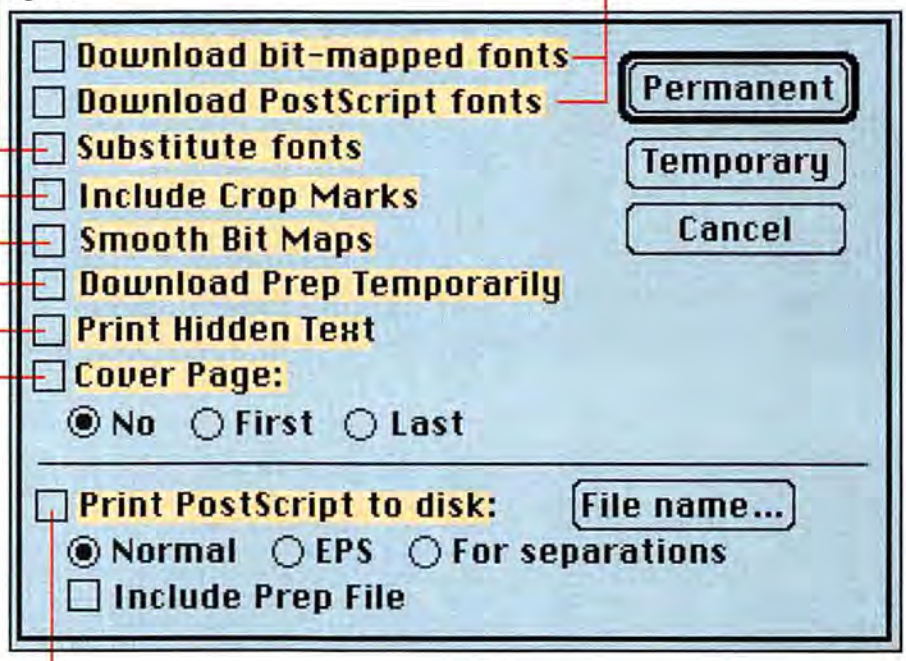
● **Download Bit-Mapped Fonts and Download PostScript Fonts:** When you select the Download Bit-Mapped Fonts option, the Macintosh sends information to the printer to help it form characters for fonts that aren't available in PostScript format. The alternative to downloading bit-mapped fonts is some sort of font substitution, in which Courier replaces the missing font. Because the character widths of the original font and its substitute are inevitably different, very poor printing results from such substitutions.

In PageMaker, deselecting this option causes an error message to flash in the Print Status dialog box, which warns you that the document being printed contains bit-mapped fonts. Assuming you didn't intend your file to contain bit-mapped fonts, you can then cancel printing and replace bit-mapped fonts with laser fonts.

When you select the Download PostScript Fonts option, the Macintosh downloads PostScript printer fonts from your System Folder to the PostScript printer if they aren't already resident in the printer. If the fonts aren't resident in the printer or your System Folder, bit-mapped versions of the PostScript screen fonts are used instead, resulting in extremely jagged output.

You should select this option only when you expect printer fonts to be downloaded from your System Folder.

Figure 3

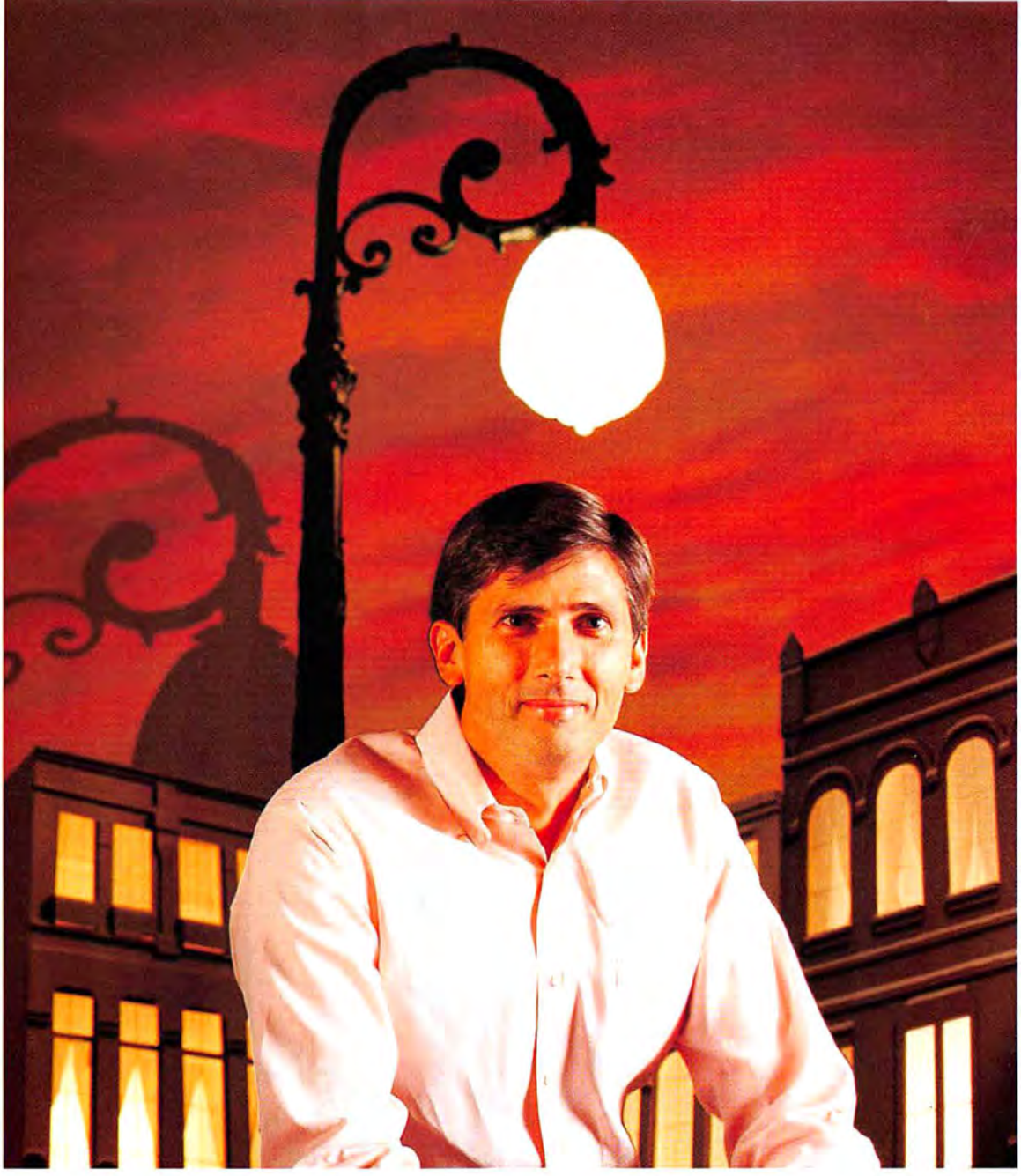


● **Print PostScript to Disk:** Print drivers, such as the LaserWriter driver used to print to PostScript printers, are really small applications that convert your on-screen file into a format that specific printers can recognize and use to create printed pages. This conversion takes place as the file is printed, and the results are sent to the printer.

When it's sent to a LaserWriter, your document is converted into PostScript, which the printer interprets. The Print PostScript to Disk option lets you capture the PostScript version of your document in a text-format disk file. This file can then be sent to a PostScript printer later or be used by another application or utility capable of interpreting PostScript files.

The ideal Print to Disk option would support the selective inclusion of prep files as well as downloadable fonts in the file and would support standard-text PostScript files, Encapsulated PostScript files (which include screen images and can be placed inside other documents), and PostScript files that include OPI comments (which can be used by high-end color-separation devices). In this implementation, the File Name button specifies the filename and location for the PostScript file that is created.

Even though most applications do not currently offer Print to Disk options, you can capture PostScript files to disk by pressing Command-K immediately after clicking on the OK button in any LaserWriter Print dialog box.



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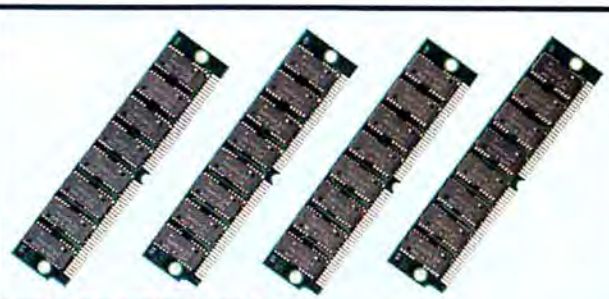
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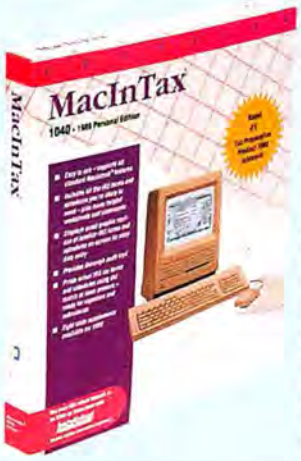
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11 Mac Portable Tips

Ask John Sculley about the Mac Portable's hefty weight and unlit screen, and he's likely to reply, "How about that battery!" True, the Portable has a long battery life, but you can make it even longer if you follow a few simple rules.

By Owen W. Linzmayer

It took NASA to solve the problem of the Mac Portable's weight — they took it into orbit. For a while, at least, Apple could claim the only completely weightless portable computer.

Some of the Portable's other limitations are easier to deal with. Extending the battery life, for instance, is simply a matter of following a few guidelines. Here are the rules that every Portable user should know:

1. Force the hard drive to sleep. Normally, after you access the hard drive, you must wait for it to delay until the amount of time has passed that you specified in the Minutes Until Automatic Sleep in the Portable cdev, before it turns itself off. But clicking on Sleep at the bottom of the Battery DA immediately puts the system into sleep mode, thereby shutting off the hard drive. Just press any key (except Caps Lock), and the system wakes up exactly as you left it but the hard drive remains off.

If you get Andrew Welch's shareware INIT called Portable Siesta (see Figure 1), putting your Portable to sleep is even easier — just press a user-specified key combination (the default is the Escape key). Portable Siesta is available from Zmac; the shareware fee is $5.

2. Avoid the Control Panel. Every time you open the Control Panel, the Mac accesses the startup drive. If you must make changes to the Control Panel settings, do them all at once.

3. Don't shut down. The Portable consumes the same amount of power in the Shut Down and Sleep modes (see Figure 2). The only reason to choose Shut Down is if you are going to install an expansion card or attach a device to one of the ports on the back of the computer. (Apple does recommend that you shut down at least once a month.) Otherwise, choose Sleep so that all of your applications and documents are instantly available when you issue the wake-up call by touching a key. Aside from this convenience factor, you save the power required to spin up the hard disk and reload files from disk.

4. Open files in batches. The hard and floppy drives are the most power-hungry components of the Macintosh Portable; both require roughly the same amount of power to spin for any given length of time. Whenever possible, open simultaneously any of the documents that you plan to use in a session. To do so, use the shift-click method to select more than one document in a folder and choose Open from the File menu or press Command-O. This launches the parent applications and opens the designated documents all in one step.



Figure 1: Andrew Welch's Portable Siesta is a shareware INIT that lets you put your Portable to sleep with a single keystroke.



Figure 2: There's only one reason to use the Shut Down command on a Portable. Otherwise, stick with Sleep.

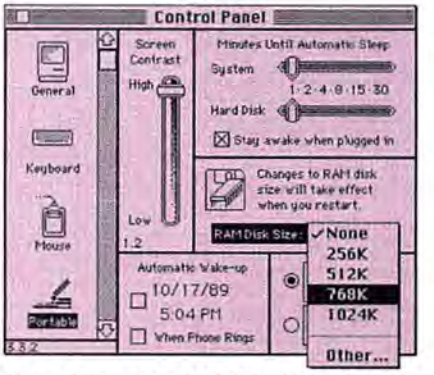


Figure 3: Creating a RAM disk with the Portable cdev is one of the best ways to avoid disk access and extend the battery's life.

5. Create a startup RAM disk. Whether you configure memory as a RAM disk or leave it available for applications doesn't affect how much power the Portable uses, so

The plane's gone down, but you've managed to swim to safety on a nearby desert island — holding your Mac Portable over your head. How long do you have before you must stop computing?

if you have at least 2 megabytes of memory, specify a RAM disk, using the Portable cdev (see Figure 3). Make it large enough to hold the required System files plus any heavily used applications and documents. Click on the RAM-disk icon on the Finder's desktop, and then choose Set Startup from the Special menu. Now instead of spinning the hard disk on startup, the Portable can quickly fetch these files from the very low-power RAM disk. Although the RAM disk retains its contents even when you choose Shut

The Death of a Battery

The plane's gone down, but you've managed to swim to safety on a nearby desert island — holding your Mac Portable over your head. How long do you have before you must stop computing?

The Portable keeps track of available power and warns you four times as the battery's charge gets low. The first alert box (see Figure A) appears when you have roughly 45 minutes of power remaining (when the thermometer gauge in the Battery DA drops below the reserve line). Once you're in a low-power situation, a battery icon flashes alternately with the Apple icon at the extreme left side of the menu bar. If you ignore the subsequent warnings, you are given one final warning when ten seconds of power remain.

After that, the system goes into a special sleep mode — a coma, if you will — and you can't wake it unless you change batteries or switch to AC power. If left in its coma for more than five days, the Portable will lose all the contents of its RAM. Also, the life of the battery will be somewhat reduced, although it can still be recharged.

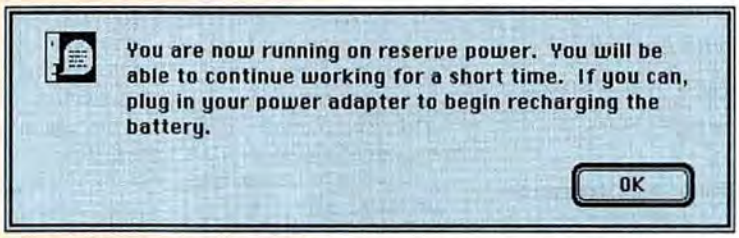
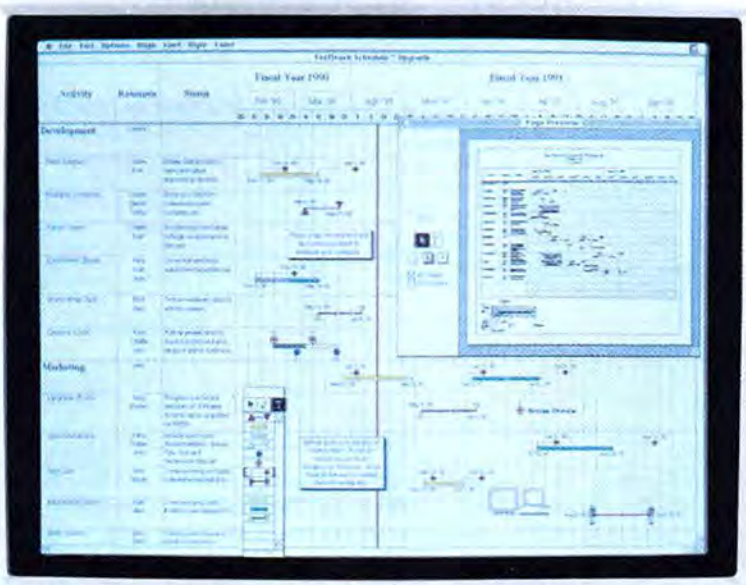


Figure A: When you see this alert box, you have 45 minutes of power left before your Mac goes into a coma.

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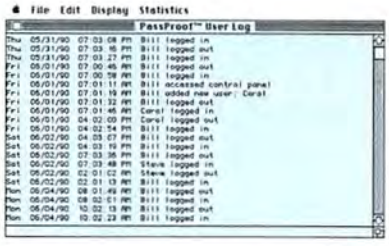


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The Portable is a robust piece of hardware, so you needn't worry too much about losing work in progress.

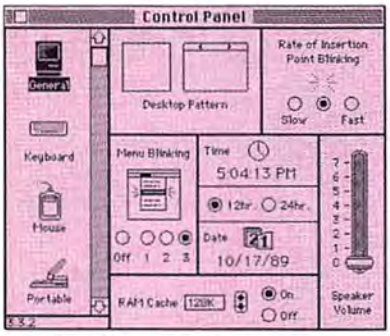


Figure 4: Multimedia may be all the rage, but keep that Portable quiet if you want the battery to last. You can use the General cdev to turn the sound off.

Down from the Special menu, for peace of mind save any really important files to a diskette every once in a while.

6. Use a RAM cache. The General cdev has an option for designating a portion of memory as a RAM cache. Frequently requested data resides in the cache, so if it is asked for again, it can be accessed much more quickly from RAM than if it has to be retrieved from a disk drive. Because the drive needn't be accessed, you won't waste power.

7. Load entire applications into memory. Some applications (such as Microsoft Word) let you specify whether the entire application should be loaded into memory when launched. Say yes. Forcing the whole program to load at once means that you avoid unnecessary disk access later on.

8. Turn off the speaker. The higher you set the sound volume, the more power is necessary to drive the speaker. Use the General cdev to lower the volume of the internal speaker as far as it will go (see Figure 4). With the speaker thus disabled, the Mac flashes the menu bar whenever a system beep occurs.

9. Use any desktop pattern you want. Some people suggest using the General cdev to change the desktop pattern to all white. The assumption is that black pixels are "on" and therefore require more power to display than white pixels. In actuality, the Portable uses an active-matrix LCD (liquid-crystal display) panel, with each pixel controlled by its own transistor. It requires power only to change the state of a pixel, and even then the amount of power involved is negligible.

10. Quit telecommunications applications when you're not using them. Open telecommunications applications require the Portable to supply power to the internal modem even if you aren't connected to an on-line service. But if you quit the application, the Portable saves power by turning off the modem.

11. Don't save as often as usual. The Mac Portable is a robust piece of hardware, so you needn't worry too much about losing work in progress. If you have a macro utility that saves to disk automatically at periodic intervals, or if the applications you use have this as an option, disable it.



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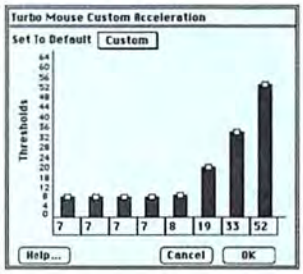
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New Year's Resolutions

Stop feeling guilty. Here are ten simple things you can do to save your Mac (and your sanity to boot).

By Michael Swaine



Every year at about this time, I clothe myself in earnestness like a politician on the stump and compose a list of New Year's resolutions. I am convinced that this is a fine and noble thing to do, and doing it makes me feel like a better person: one who eats right, gets plenty of exercise, remembers everyone's birthday, and backs up his hard disk.

This feeling lasts about a week into the new year. By then I have violated every resolution I haven't forgotten first. The whole experience leaves me so demoralized that I almost consider casting off the tatters of my self-respect and running for public office.

This fall I tried something different. I made up a list of resolutions again; I don't seem to be able not to engage in this particular bit of depravity. But I won't have to worry about breaking them this January, because I'm not making them for myself.

They're for you.

Here are ten resolutions for using your System (or your system) wisely in 1991. They're so fundamental that you're probably already honoring some of them now and can check them off immediately. And I've given you a weasel clause in each resolution. As Leona Helmsley could easily have said, "I wouldn't accept a New Year's resolution without a weasel clause. Why should you?"

In each of the resolutions, *I* is you. In the explanation that follows each resolution, *I* is me. I mean I.

1. I resolve to save my work often enough.

Often enough is the weasel clause in this one. It means whatever you make it mean, but I recommend you try one of the following interpretations:

• So often that, when my office mate trips over the power cord and the screen goes blank, I ask her if she's all right before I ask myself how long it's been since I saved my work.

Or

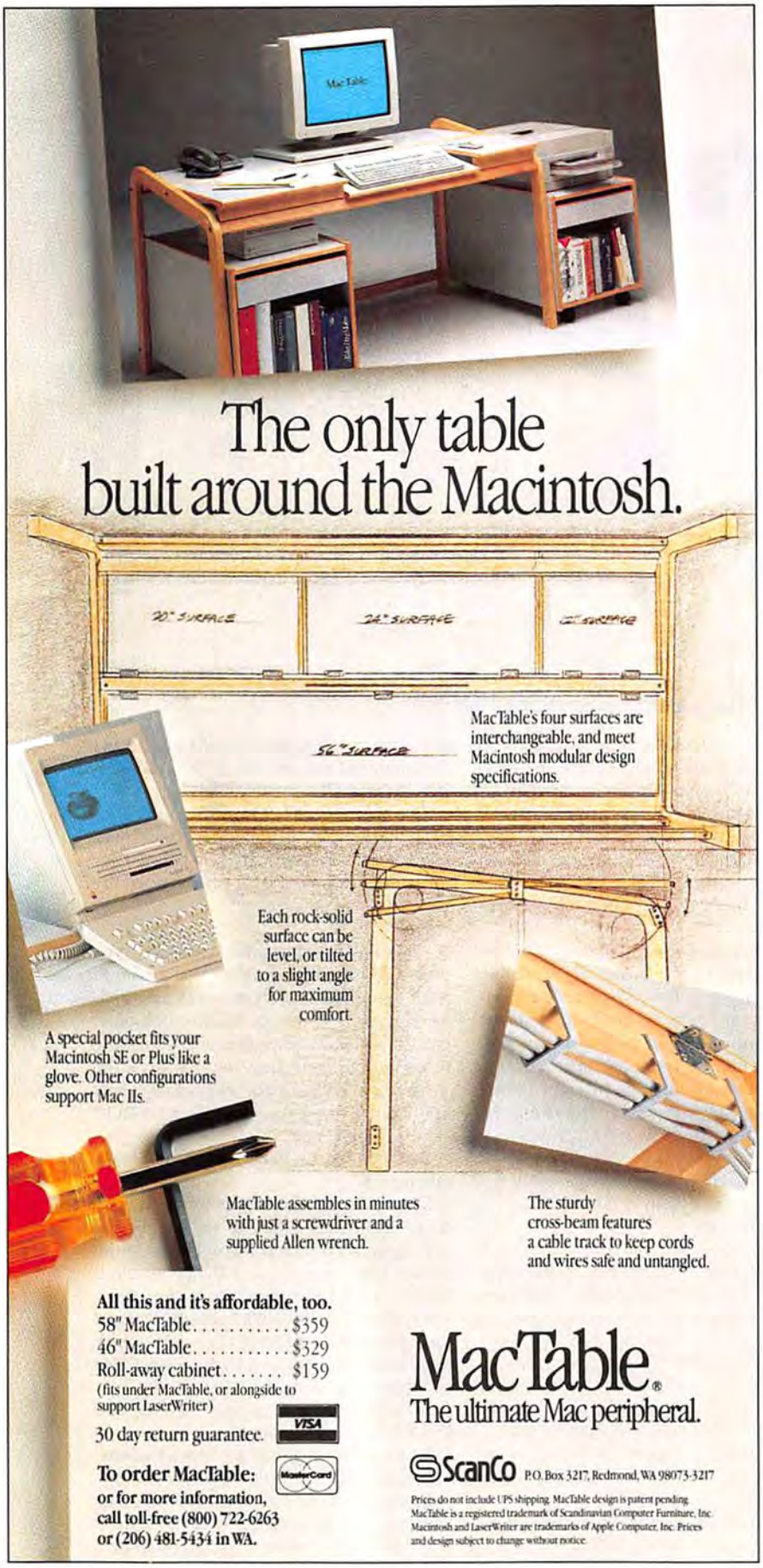
• So often that it becomes a reflex. If you press Command-S whenever you get up to refill your coffee cup, if you press Command-S before answering when asked a question, if you press Command-S whenever you pause to gather your thoughts or wool, yours is the world and everything in it, and that's not bad. So forget all that right-brain/left-brain stuff. This is a spinal task.

2. I resolve to back up all my work adequately.

There are a lot of strategies for backing up files. *Adequately* refers to the number of backup copies you keep. Two is the minimum for any files you really care about, but if you think you need five, make them. And don't worry that the shrink-wrap license agreement on most software packages says that you're allowed to make only one backup copy. This unenforceable and obnoxious drivel was written by some anal-retentive lawyer who should be shrink-wrapped.

3. I resolve to organize my files somehow.

It's amazing how little it matters just *how* you organize your files. And it's amazing how much it matters that you have *some* system of organization and that you respect



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BEATING THE SYSTEM

It's amazing how little it matters just *how* you organize your files — and how much it matters that you have *some* system of organization.

it. There's a trick, though, and unless you know it, you will be forever undermining your organizational efforts. It's very simple: Pay attention when the Save As dialog box comes up the first time you try to save a newly created file. That way, you can save the file into the folder in which it belongs rather than into whatever folder you happen to have opened most recently, which is exactly what will happen unless you specify otherwise. The first Save of a new file, however, is *not* a spinal task.

4. I resolve to use spelling checkers appropriately.

I wish I could tell you what that might mean. So many computer-magazine reviewers have written confidently about the virtues of these programs that I know they must be good for something. It passeth my understanding what that might be, because it sure isn't proofreading. Here's my advice: When you don't really care about errors in your copy, send it off and don't worry about it. When accuracy matters, have the copy proofread by a human being. In all other cases, use a spelling checker.

5. I resolve to rebuild my desktop annually.

That's how often Apple recommends. Rebuilding the desktop improves your system performance, so you might want to do it today, but the weasel word *annually* gives you the rest of the year to get around to it.

6. I resolve not to use commercial software or shareware without paying for it.

There's no weasel clause in this one. Commercial software and shareware authors deserve compensation and sometimes even respect for their efforts. It's a matter of payment for value received. If you use it, pay for it. Unless, of course, you're a journalist and it's a review copy.

7. I resolve to send in my registration cards promptly.

Sending in your registration cards is just good sense; it makes it possible for the company to reach you in the event of

a product upgrade or recall. However, you should feel no obligation to be accurate or even credible in supplying any demographic information requested on registration cards. Say you live on the moon and own two Crays if you feel like it. No doubt, accurate information about your buying habits and the amount and value of electronic equipment at your site is valuable to the company, but what were we just saying about payment for value received?

8. I resolve to keep my computer reasonably clean.

Some day it may save your life. No, I think that's your M-16. Anyway, some people say that you shouldn't eat or drink near a computer. This makes no sense to me; what I think they mean is that you shouldn't crush potato chips into the keyboard or pour liquids on the motherboard. You shouldn't. I avoid doing those things myself and otherwise try to keep a clean machine. It's not only because of the risk of data corruption, hard-disk crashes, and fried motherboards, although those are all on my personal list of Catastrophes I'd Prefer to Avoid. I just can't handle any more verbal abuse from the service technician who has such a *thing* about dog hair.

9. I resolve to experiment.

Try new things. Let someone else try them first, but try them. Continue to learn about the system software and applications you think you know well. Try to learn one new keyboard command equivalent a week for, oh, a week or so — not because keyboard command equivalents are necessarily faster or easier or more impressive to your friends but because ease of use is context-dependent. The keyboard command equivalents that are of any use to you are the ones you know in your bones. Teach your bones some new tricks. Ask questions, and be neither too arrogant nor too shy. You don't know so much, but neither does the so-called expert down the hall. We're *all* new to this.

10. I resolve to look out of the window now and then.

Smell the roses, or at least the coffee. Go for a walk. Spend more time with your family. Give your dog a good brushing. There is no keyboard command equivalent for real life.

In real life, Michael Swaine writes about HyperCard and other hyperstuff in *HyperPub*, a hypermedia journal published by The Prose Lab, 31 Patrick Road, Santa Cruz, CA 95060; (408) 459-8564.

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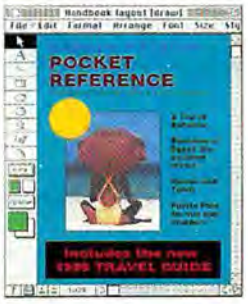
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System 7.0 Watch: The Virtual Napkin

In months past, we've engaged in some creative visualization, picturing the features of Apple's long-awaited System 7.0. But we haven't spent much time thinking about what use we might make of these features when they actually arrive. Because Apple has given us some more visualization time before we actually see System 7.0, I'd like to introduce one use to which it can be put: To develop the 1990s version of the paper napkin.

In his book *Shared Minds* (Random House, 1990), Michael Shrage takes his readers on an urban safari, through remote access and darkest databases, through research labs and corporate conference rooms, in search of the ways in which computers might be used to aid collaborative work. Along the way, he encounters more-primitive beasts, including such traditional aids to collaboration as the paper napkin.

Shrage is quite convincing in his presentation of the paper napkin as a tool for collaboration.

Here's the scenario: You're having lunch with a colleague, say, and discussing the structure of a particularly tricky negotiation in which you're both going to be involved. He wants to present the points of the case in an order that makes no sense to you. After some fruitless arguing, he pulls out a felt-tip pen and sketches the structure of his argument on a paper napkin and then takes your napkin and sketches what he takes your outline to be. Now you see why he has organized his points as he has, but you also see how he has misunderstood your intended organization. No, you tell him, taking over the napkins and pen, this point goes *here* and this point is really *this*.... He finally gets it and requests another napkin to sketch out a new organization based on your ideas and his. After dessert, you take the napkin back to the office and turn it into a laser-printed memo.

Now here's the question: If you had been in the office, at your computer, with an outline of your intended presentation on the screen and your colleague there, looking over your shoulder, how would the scenario have played? If the two of you had been talking to each other on the telephone? Sending E-mail messages back and forth? Would the collaboration have been as fruitful, as efficient, in any of these other scenarios?

Shrage doesn't think so. He thinks there are some tasks for which it's still hard to beat a felt-tip pen and a paper napkin. And the kinds of tasks he has in mind are precisely the kinds that require collaborative effort.

By *collaboration* Shrage means more than just communication. What makes the napkin so useful is that you can pass it back and forth, refer to it, mark on it. Like a blackboard (another good collaborative tool), it gives the collaborators what Shrage calls shared memory. In addition to the channel of communication, collaboration requires an area accessible to both (or all) collaborators where information can be viewed and manipulated by all. Mere communication doesn't have that. It lacks a quality of napkinness.

There are some drawbacks to the paper napkin as a tool for doing serious work. One is the awkwardness of making changes in the model. Another is the limited size of the napkin. But these are the same drawbacks that a typewriter has when compared with a word processor. It sounds as if what we need is a virtual napkin.

Here's that scenario: You and your colleague are talking on the phone, both of you looking at and fiddling with and annotating the same diagram on your respective screens. No sooner do you make a change than the results appear on the other screen. If you want a small sense of what this kind of collaboration might feel like, try plugging your mouse (when the Mac's off) into a colleague's spare ADB port and sharing a screen for a while.

That's what Shrage's book is really about: electronic napkins; electronic blackboards; conferences in which everyone can electronically manipulate text, pictures, and models in a shared space. Tools such as these do actually exist, and some companies and research institutes are exploring their uses. There are even some commercial groupware products that touch on these capabilities.

But to do collaboration right, there are some fairly specific operating-system capabilities that would be very helpful. Transparency of access to information across networks and across phone links. Ways for applications to talk to one another. Ways for chunks of information to be shared rather than merely sent. System 7.0 supplies just these capabilities.

The significance of System 7.0 will be in the new kinds of applications it allows developers to create. Collaborative tools could well be the most significant of these.



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MacUSER LABS NetWorkShop

MacUser Labs Announces The Opening Of Its NetWorkShop



Today the Macintosh is no longer a stand-alone computer. Macs are found in every type of department and every type of business. And they are not just running DTP applications. Spreadsheets, word processing, accounting packages, engineering applications, multi-media – Macs are running whatever business needs. They are interfaced with IBM mainframes, VAXes, Sun and other UNIX work-stations, and MS-DOS personal computers.

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That's why MacUser, the leader in providing brand specifiers objective, thorough and reliable information, announces the opening of the NetWorkShop, a major new extension of its MacUser Labs.

The only independent testing facility for Macintosh products intended for networked systems.

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From the moment plans were begun to the time the last wires were punched down, no expense was spared to ensure that MacUser would develop the industry's most authentic workgroup environment dedicated entirely to connectivity, networking and productivity issues. As different platforms and new technologies proliferate, the NetWorkShop will emerge as an indispensable information resource for Macintosh business buyers and vendors.

AN UNPARALLELED INSTALLATION MacUser Labs' NetWorkShop is a one-of-a kind facility with the capacity to hold 60 CPUs plus monitors and printers. It has custom-designed racks connecting all the CPUs to a patch panel where any CPU can be connected to LocalTalk, Ethernet or Token Ring. On site are over 30 Mac's of all kinds, a NeXT workstation, a Sun SPARCstation, two micro VAXes, and four IBM compatibles; Novell NetWare and 3COM 3+0 Open File Servers, and a variety of routers and gateways. It incorporates the major operating systems including UNIX, VMS, DOS, OS/2 Windows, and Mac OS. Products to be tested include big servers, 10BASE-T Ethernet cards and concentrators, multiuser databases, routers and gateways, network management products, Mac as a workstation, terminal emulation software, multi-platform and multi-protocol integration, and any Macintosh product capable of operating in a networked environment.



A STAFF OF EXPERTS Headed by Technical Director Henry Bortman and Labs Director Andrew Eisner, the staff of the NetWorkShop represents a remarkable 40+ years of experience in a field just over five years old. Each lab member has a recognized standing in the Mac industry. Together they form a highly coordinated team with an unassailable reputation for integrity.

REAL WORLD TESTING No ivory-tower analysis can provide meaningful information to serious buyers. MacUser Labs' NetWorkShop has been designed to simulate conditions likely to be encountered in any modern business environment. The staff contacts vendors and buyers to pinpoint the technical issues and characteristics that distinguish the products, then develops test



scripts with the goal of asking the right questions and finding the answers.

SURVIVAL INFORMATION FOR DEALING WITH THE 90'S The real art of lab testing is interpreting data – distilling it into critical information buyers can use to make intelligent purchase decisions. We analyze the data, interpret it, then write insightful recommendations that buyers must have to make product choices appropriate to their specific business requirements.

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MACUSER-PREFERRED FOR INFORMATION MacUser Labs' NetWorkShop is yet another example of the many invaluable services on which MacUser has built its reputation in this highly important, rapidly growing industry.

The NetWorkShop employs the same high standards of accuracy, reliability and pertinence that has gained MacUser its remarkable degree of influence among today's Macintosh Brand Specifiers.

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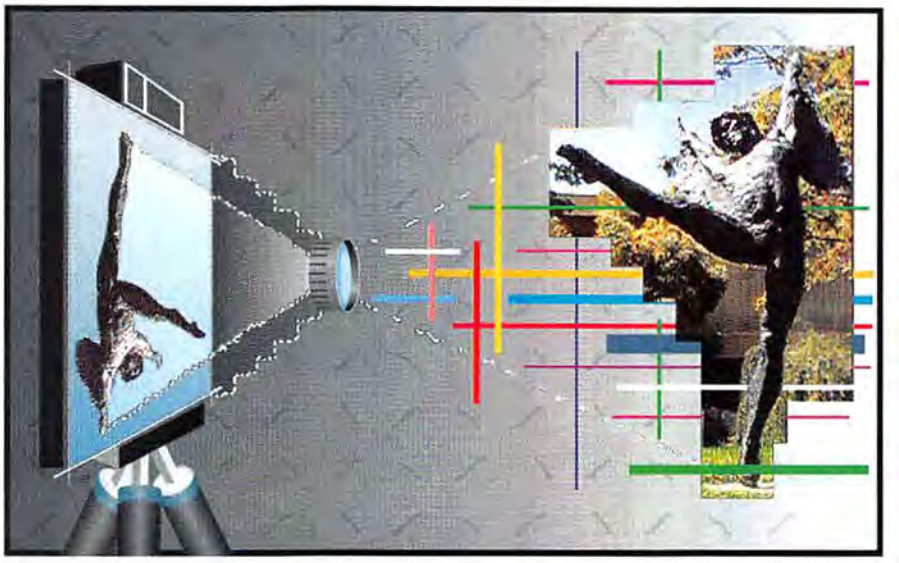
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The Picture-Perfect Mac

Do you take pictures? Get ready for desktop photography. Putting color photos onto your Mac has become both easy and affordable, thanks to filmless cameras.

By Thom Hogan



Have you ever noticed how many desktop-published documents look so, well, computer-generated? It doesn't help that most of them stick to tried-and-true Times and Helvetica typefaces (my favorite combination is Palatino for text and Futura Bold for headlines, but that's another column). The most telltale sign that a document is desktop-published, however, is the artwork.

That's not to say that the artwork isn't good. I've seen some very impressive computer-generated drawings, with a pizzazz and style that wouldn't have been possible with traditional methods. But the problem is that computer art, whether drawn from scratch or served from a can (well, a floppy or a CD-ROM), tends to be very precise. Straight lines are straight, color fades are linear, fills are perfect, and so on and so on. I'm not here this month to berate computer art, but it is the very precision of computer-generated illustrations that calls attention to the ingredient missing from most desktop publishing: photographs.

Photography in desktop publishing? Sure, no problem. Let's see, first I go out with my 35mm camera and take some photos. I send the film off to the lab and wait for it to come back. I find a shot I like and send it back to the lab to have it printed in 8 x 10 form, cropped and dodged as necessary. When the print comes back, I stick it into my scanner (or go to use one at the local service bureau). After a few test scans and adjustments, I complete my scan and save the document. Next, I bring up the document in Digital Darkroom (for black-and-white) or Adobe Photoshop (for color) and work on it some more (there's another column idea). I save the results and pop on over to my desktop-publishing program, import the picture, and place and crop it. Now, if the photo is color and I'm using PageMaker, I make sure to use PrePrint to process it. If, on the other hand, I'm in a QuarkXPress 3.0 mood this week, no additional steps are really necessary. I send the result to my local Linotronic bureau, and next thing I know, I've got desktop publishing with photos in it.

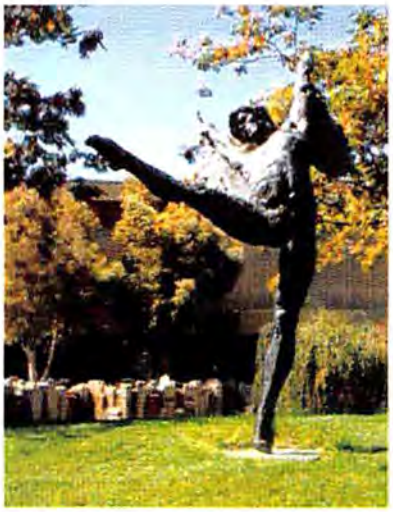
Seems like a lot of steps, doesn't it? Wasn't the computer supposed to improve my productivity? Am I avoiding photography in my desktop publishing because it's just too hard to use? The answers, respectively, are yes, yes, and yes.

There's got to be a better way.

Actually, the better way is Canon's, and it has been available for well over a year. It's only as I write this that Canon has finally figured out that there's a ready market for another one of its nifty engineering toys. (Canon has a reputation for inventing great things that it can't figure out how to sell: Witness the LaserWriter, which uses a Canon-invented engine that Canon never managed to sell to users in quantity under its own name.) This year's toy (excuse me, make that tool) is, ta-dah, the Canon XapShot (pronounced *zapshot*).

The XapShot is an electronic-imaging camera. It works much like a run-of-the-mill





If you want to add color photos like these to desktop-published documents, using an electronic-imaging camera is an inexpensive and easy-to-use solution — and you won't need a scanner.

35mm point-and-shoot camera, but it stores images (up to 50) on an itsy-bitsy floppy disk instead of on traditional film. Using the XapShot camera is a little eerie. It makes an almost inaudible hum (the sound of the floppy-disk drive turning the 2-inch disk) when turned on and ready to shoot. When you press the shutter release, you don't hear much of a click, and it doesn't seem like anything has happened (unless you have the flash on). A small LCD display reports a few things, most notably which picture you're on.

Photography buffs will find the camera basically featureless. The 11mm f2.8 lens is about the equivalent of a normal 60mm lens on a 35mm camera. Focusing is automatic, except for macro, which presets the focus at 12 inches. The flash choices are always on, automatic, or off. A backlight-compensation button provides an extra 1.5 stops of exposure, although the button is poorly designed so it's impossible to tell when you've engaged this function. The viewfinder is small but very near the actual lens, so parallax on close-ups is admirably small. There's no lens cap, but the lens itself is covered with a clear glass pane, which you need to keep clean of the usual fingerprints and dust. The whole unit weighs in at about one pound with the battery pack installed and fits into the pocket of my walking shorts. The battery

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THE EXPERT'S EDGE

is rechargeable, and Canon claims that it lets you take about 800 pictures when it's fully charged, assuming that you avoid the flash (more on that in a bit). As the old adage goes, your mileage may vary; mine sure has.

You can record over previously shot pictures. (There is a protection mechanism to keep you from doing this accidentally, but the temptation is great to start playing mental games: "Hmm, this shot is better than that third one I took; I'll just record over it." Don't do it! When you get home you'll find that it was the fourth shot, not the third, that you wanted to record over. Bring extra floppies instead.)

With the camera comes a battery-charger station that also can act as an AC adapter and video-playback base station. You don't need the charger to play back pictures, but it is usually most convenient to use it — you often spend more time reviewing pictures than you do taking them, and you won't want to exhaust the battery.

For those of you who for some reason don't like the Canon, Sony makes a similar model, called the Mavica. I don't like it as much: It's a little bulkier, the lens doesn't seem to be quite as good, and the playback method is a lot more cumbersome. Besides, I got my XapShot for $371, and the cheapest Mavica I could find was $498. Nevertheless, the cameras are basically the same, and if the Mavica had been cheaper than the XapShot, I probably would have bought it instead.

One big negative point regarding these electronic-imaging cameras is that they eat batteries like I do cookies. I told you that my mileage varied — in some cases, I didn't even manage to fill a disk with pictures before the battery needed a boost. When you first start using the camera, I can guarantee that you'll end up missing that "great shot" because the batteries died in the middle of your photo session. And you really don't want to carry the AC adapter around with you, as that defeats the whole purpose of having a lightweight, portable camera in the first place. The solution: Buy an extra battery pack, and be diligent about keeping packs charged when you're not using the camera. Turn the camera on only when you're going to take a picture (learn what it feels like when the On button is activated), and avoid using the flash whenever possible. Fortunately, the camera automatically powers itself down when you don't use it for more than a few seconds, but it's still easy to keep your finger partway down on the shutter while you're waiting for that "perfect" picture. Remember, though — all that time, you're also powering a small disk drive.

The battery adapter has an LED display that tells you when the battery is charging — when the light goes off, the battery is fully charged. Thank you, Canon. Most chargers I've seen give no indication of when the battery is charged.

When the XapShot first appeared (I initially wrote about it in my newsletter back in the fall of 1989), the cheapest price I could find was $1,299. Pretty pricey for a simple camera. No longer, however. Yesterday a photo discounter here in the San Francisco Bay Area was running an ad that offered the unit for $389, which is much closer to what it's worth. Unfortunately, the list price is $698, so there's still a lot of room for pricing differences. Given the increasing popularity of these cameras, however, the prices are likely to continue dropping as volume picks up. So shop around.

I asked the sales reps at my local outlet if they'd been selling many XapShots. "Sure have," came the reply. It seems that real estate agents have discovered that the XapShot is the perfect substitute for a Polaroid camera. Especially real estate agents who have Macintoshes and want to import the pictures into their desktop publishing. Which brings me to using the thing in real life.

OK, so you've got this nifty little camera that stores pictures on 2-inch floppy disks. Big deal — your Mac doesn't have 2-inch disk drives. True. And here's the biggest problem with the XapShot and its cousin, the Sony Mavica: Even though images are stored on disks, the information being stored isn't digital — it's analog! That's right, what these cameras do is store a television image (NTSC video is analog), not a string of bits. That means that you must employ the camera as a playback device or use one of the accessory playback devices to see your results, and those results are like any video signal. And, as you know, the Macintosh can't input raw video signals.

Fortunately, there's activity in the Mac video area. And as we're trying to put together a simple modest-resolution picturing system, you won't have to go out and buy one of those $5,000 do-all video-frame grabbers. No, even the simplest frame grabber will work for our purposes. If you already have a video board in your Mac II, my suggestion is to use Digital Vision's ComputerEyes line



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Tear-off Menus	Yes	No	No
Enlarged Cursor	Yes	Yes	Yes
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of digitizers. I've seen the black-and-white version for as little as $249 (list $299) and the color one for just $150 more. They work perfectly well in getting XapShot images into the computer, where you want them, and come with pretty decent image-processing software.

Personally, however, I've been using a somewhat higher-priced setup. RasterOps has just introduced its 364 video board, which, besides replacing an Apple display board, gives you 24-bit-color capabilities and the ability to watch and capture video images in Macintosh document windows. Several other boards of this type are available on the market too. If Apple is truly interested in being a player in multimedia, it needs to build the equivalent of these boards into every Mac. Like the ComputerEyes digitizers, the RasterOps 364 board comes with excellent image-capturing software. If you want to play Rembrandt and touch up your images pixel by pixel, I recommend Adobe's Photoshop. I captured all the photos accompanying this article with the 364 board, however, and did no additional work on them — I accepted the default chroma, hue, saturation, white-level, black-level, brightness, and contrast values so that you could see the pictures in their basic state. With some work, you could make each of these images look better. Also note that the graininess of the photographs is more due to the limitations of the 364's digitizing resolution than to any limitation of the camera — with a higher-resolution digitizer, I could have gotten better results. I find the 364's resolution acceptable as it is for casual work, however.

So let's see how to get those video images into the desktop-publishing files:

1. Take the pictures with the XapShot.

2. Plug the XapShot into the RasterOps 364 board (actually, I leave my battery-charger station plugged in to the 364 all the time, so all I have to do when I bring the XapShot home is pull out the battery, put it into the charger, and plug the charger's power and video cord into the camera).

3. Start up the RasterOps imaging software, and use the XapShot's controls to play the photo you want to capture.

4. Capture the image.

5. Manipulate the image by cropping it, modifying the color values, and so on — if necessary.

6. Save the image.

7. Start up your desktop-publishing program.

8. Import; place; and, if necessary, crop the image.

There are drawbacks to this system, however:

• Resolution is not as good as high-quality film-based photography, even if you use a better digitizer than I did.

• You still need to perform some manipulations on the captured image to get the best possible quality. Printing the resulting document can be a hassle if you're into color or high-resolution devices such as the Linotronic.

• The RasterOps 364 I use captures the image in only two sizes. (The images accompanying this article are shown at the smaller size. The larger size is basically 640 x 480 pixels.) This limitation is true of many digitizers.

• The colors are good, but they never show the kind of saturation a good slide film such as Kodachrome does.

• You're stuck with a single, normal lens, and you can't vary perspective.

But there are many pluses as well:

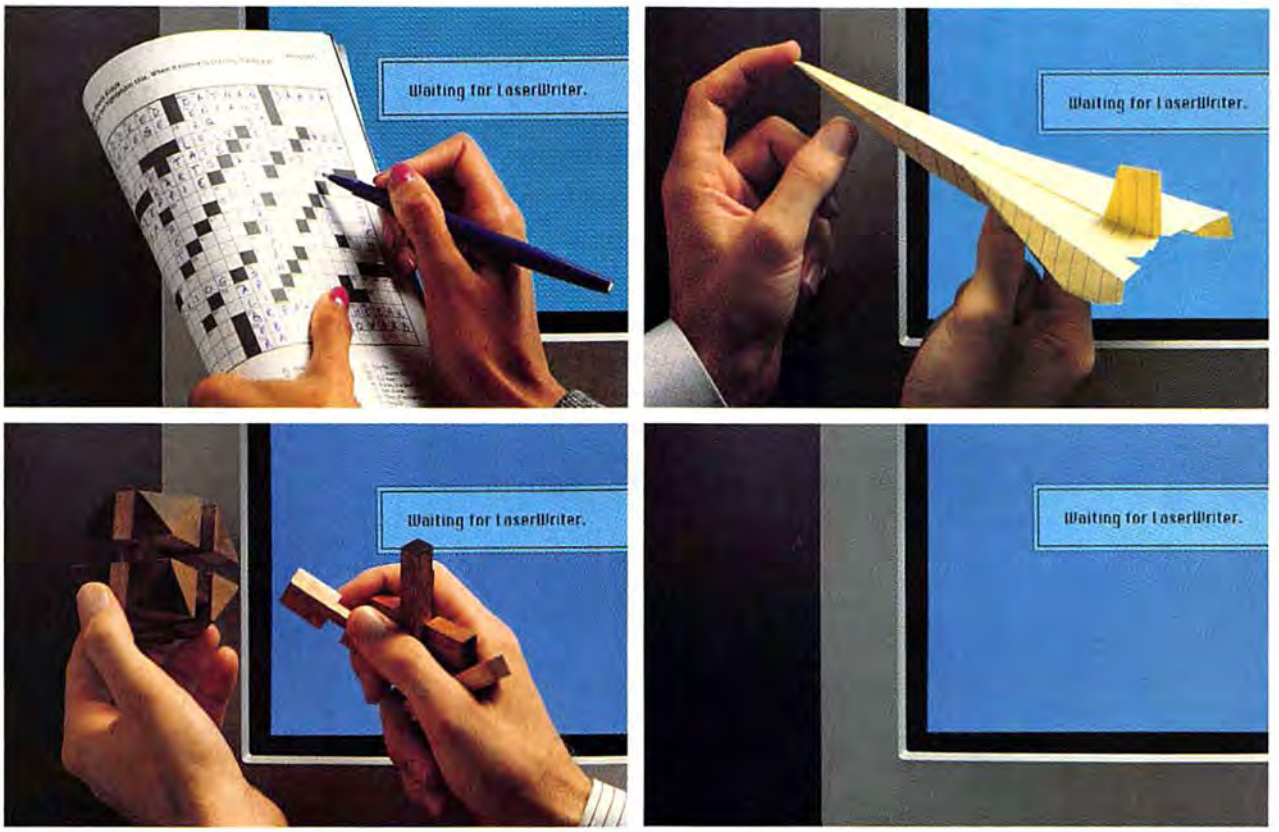
• There's no waiting for film processing, and you don't have to pay its attendant costs (a 2-inch floppy costs about the same as a roll of film with processing does, but you can reuse the floppy).

• Image input is a lot easier and can be instantaneous with the RasterOps 364 board; the necessary hardware is cheaper than a good scanner.

• Moreover, there's something unique about shooting video stills. Maybe it's just the newness of the tool and the weird, flat shape of the camera, but I find myself shooting stills differently from the way I do with my 35mm equipment. And I find I'm more likely to take the XapShot with me everywhere I go than to take my professional-caliber film equipment.

One last suggestion: Many of you might find yourselves frustrated by the XapShot's single, fixed-focal-length lens and lack of controls. Canon makes other still-video models, although I don't recommend them, because they're overpriced and underfeatured. A nifty alternative is to use an 8mm video camcorder instead. There are a couple of caveats here, which I'll get to in a minute, but the prime advantages are that you end up with an almost unlimited number of stills, a zoom lens, control over shutter speeds, controls for balancing color images properly, the ability to annotate your shooting via the microphone, higher resolution abilities if you pick the Hi8 format instead of regular 8mm, and much more.

Idle Macs Are The Devil's Playground.

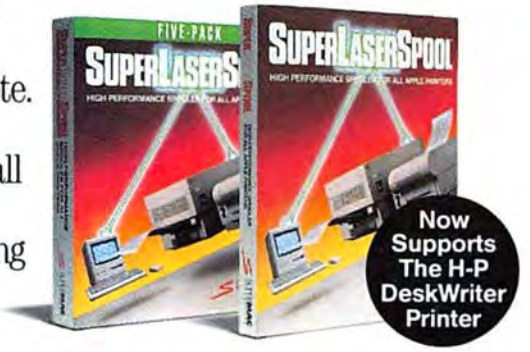


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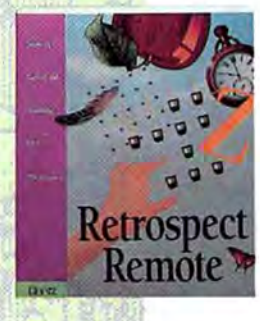
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I expect to see more newsletters and reports with photographs in the future, you hear? Give your copies of Illustrator and FreeHand a rest for a few months.

The caveats: You've got to learn to shoot *still* video, which means that you don't move the camera and you don't shoot moving subjects, where possible. Use a high shutter speed so that action is stopped completely. Make sure you wait for the auto-focus to settle in (or turn it off, and focus manually) before you turn off the recording. You must test the camera's ability to still-frame without jitter — preferably before you get into that need-to-shoot situation. Plan to spend some time trying to find the still frame you want to capture, as you're likely to be searching through as much as 120 minutes of tape. (Hint: Use short tapes, and use the audio track to pinpoint the actual shots.) The ability to still-frame without jitter is probably the biggest requirement of a video camcorder, if you want to use its images in your desktop publishing. And not all camcorders are equal in this respect, so test before buying.

There you have it. I expect to see more newsletters and reports with photographs in the future, you hear? Give your copies of Illustrator and FreeHand a rest for a few months. Go ahead. Trying something new is the way we learn and grow.

Meanwhile, all you film-based photographers have probably read to the end of this column; shrugged your shoulders; and said, "So what?" Well, for you celluloid junkies, I've been looking at a few tricks that might just get your photographs into the desktop-publishing world yet. You'll still need a digitizer, so go back and read my comments about the RasterOps 364 board and the ComputerEyes digitizers a little more carefully. And then hold your breath. Part 2 of this article will be along soon.

As you read this, Thom Hogan is likely to be found hauling too many pounds of still-video and film equipment across the Galapagos Islands in search of wildlife (note: not Wild Life, but wildlife). We assume the Ecuadoran government will let him return to author future Expert's Edge columns.

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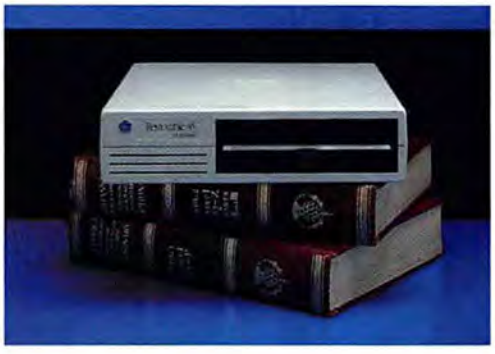
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Binary Browser

An 'upgrade' of Browser shows how to handle a fundamental challenge for Mac programmers — resource and data forks.

By Kurt W. G. Matthies and Thom Hogan



Last November, we introduced a file browser, Text Browser, that extended our generic application shell to display the contents of a file. Text Browser uses TextEdit, the Macintosh text-display manager, to display the file, which makes it ideal for text-only files but not so hot for binary ones. Text Browser has two major faults: It ignores a file's resource fork, and because of TextEdit's built-in limitations, it can display only small files.

This month, we'll take a second pass at our file browser by creating Byte Browser, which overcomes the shortcomings of its predecessor. Along the way, we'll discuss resources, binary-data display, and the operation of Browser's Window menu.

The most obvious difference between Text Browser and Byte Browser is in their displays. Figure 1 shows how each of the programs displays the same file.

Other differences between the two Browsers lie beneath the surface.

One File: Two Forks

Macintosh files have two parts, called *forks* (see Figure 2). In fact, a Macintosh file is actually two files in one. The *data* fork contains application-specific data, and the *resource* fork contains formatted resources.

The format of a file's data fork is defined by an application's developers. Some file formats, such as the SYLK file format, are a matter of public record, but most are closely guarded secrets. On the other hand, the content of a file's resource fork follows an Apple-specified format. The resource fork contains resources, such as font bit-map data, a dialog-box template, or — if the file is an application — the application's code segments.

The Macintosh Resource Manager provides a structured programming interface to a file's resource fork. The Resource Manager is actually a small database manager, and the format of a resource file is designed to facilitate speedy access to a resource. The Resource Manager's routines retrieve an individual resource through its resource *specification*, which consists of a four-character key called the resource type, and a resource number.

The resource type is defined as a packed array of four characters and is specified in THINK C as a string between single quotes, as in 'ALRT'.

The resource number is a signed integer, used to uniquely identify resources of the same type. It also has an intrinsic meaning: Negative resource numbers indicate system resources, and positive values greater than 127 indicate application resources.

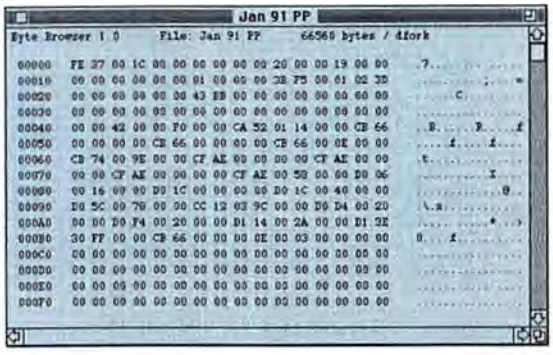
Accessing the Resource Fork

Text Browser is severely limited in its ability to view files; in fact, Text Browser shows you only part of the file — the data fork. Byte Browser can read both the resource and the data forks. Because a file's resource fork can be very large, Byte Browser's buffer-management scheme differs from its predecessor's. The size of the file that Text Browser can read is limited by TextEdit's maximum buffer size, but Byte Browser can

POWER PROGRAMMING



Figure 1: Text Browser and Byte Browser display the same file. Text Browser displays only ASCII data intelligibly, whereas Byte Browser accurately displays the hexadecimal values of each of the bytes in the first line of the Text Browser display.



display a file of any size. This is important, because a file's resource data is typically much larger than its nonresource content.

Normally an application reads a file's resource fork by using Resource Manager routines such as **GetResource**. But because Byte Browser is interested in a file's content strictly as data and not as resource templates, it reads the resource fork by using the File Manager routine **FSRead**. **FSRead** can actually read the data fork, the resource fork, or both — Text Browser uses it to read the data fork. Which fork it reads depends on how the file is opened.

Text Browser uses **FSOpen** to open the data fork, and Byte Browser uses **OpenRF** to open the file's resource fork. Both File Manager routines return file-reference numbers, but the numbers are different for the two forks.

The Binary Display

Byte Browser displays 256 bytes at a time, consisting of 16 lines of 3 columns. It also displays a file header at the top of the screen. In the far-left column of the window, Byte Browser displays the current file offset, relative to the beginning of the file. Then it displays the file's data twice: In the center, bytes are displayed in hexadecimal format, 16 characters to a line; on the right, the line is repeated in ASCII form, with nonprintable characters displayed as dots.

Byte Browser's update routine calls the display routine, **drawByteIF()**, which is in Display.c. Example 1 shows an excerpt from **drawByteIF()**.

drawByteIF() constructs three buffers — **offsetbuf**, **hexbuf**, and **asciibuf** — from the file data for each line of the display, and it uses the C library function **sprintf()** to format the buffers. Each line is drawn in three parts from the string components of these three buffers, and each line is constructed separately, controlled by an outer loop.

drawByteIF() creates the line's offset string in one shot. The hex and ASCII buffers, however, are created character by character. Within the inner character loop, it builds a temporary buffer with the current character and uses **strcat()** to concatenate the temporary buffer to **hexbuf** and **asciibuf**. **drawByteIF()** uses **isprint()** to check that each character is a printable ASCII character and substitutes a dot in the output string for characters that fail this test.

It is natural to manipulate the line buffers as C strings, because of the wealth



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of C-library string routines. However, the Macintosh string-display routine, **DrawString**, requires Pascal strings, so just before output, **drawByteIF()** calls the THINK C utility **CtoPstr** to convert the strings to Pascal.

The Window Menu

Byte Browser maintains a Window menu, which you use to select a new top window. You can select the first nine open documents with the Command key and keys 1 through 9.

The menu's underlying structure, called the open-document list, contains the data structures necessary for maintaining the menu. As you open and close documents, a set of routines in the source file DocList.c manages the open-document list and adds and removes menu items from the Window menu.

The list itself is contained in the static variable **sDocListHdl** and consists of an array of **DocInfo** structures — that is, each open document is represented by an element in the **DocInfo** array. Each **DocInfo** data structure contains the window pointer; the corresponding menu-item number; and the window's keyboard command equivalent (called the slot number), if any. Example 2 contains excerpts from these data structures.

Adding Windows to the List

Whenever Byte Browser successfully creates a new document, it calls **addToDocList()**, which assigns a keyboard command equivalent to the

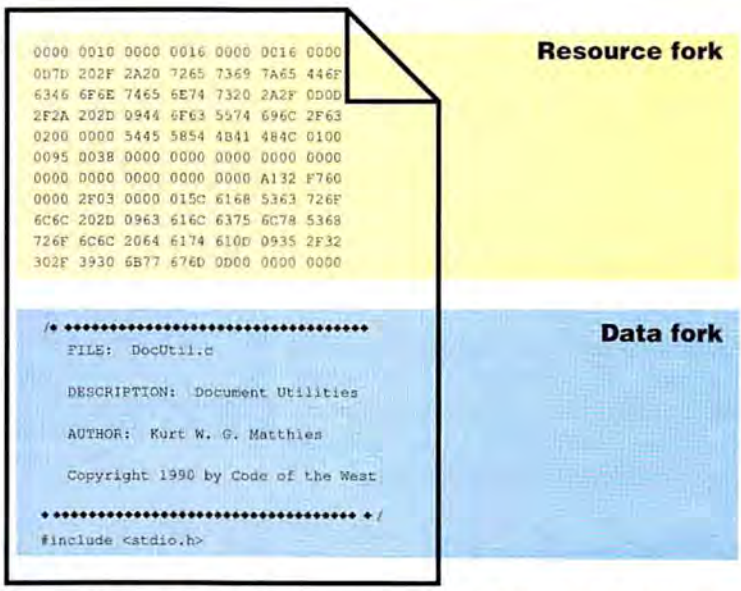


Figure 2: Almost all Macintosh files are made up of two distinct parts: the resource fork and the data fork.

Making a SPLAsh

The Symantec Programming Languages Association — SPLAsh for short — is a new programmers' group targeted at users of Symantec's languages. Greg Dow, developer of the THINK C class library and founder of SPLAsh, writes in the first issue of the group's journal, *THINKin' Cap*, "SPLAsh's goals are to provide pertinent and practical information for THINK programmers.... Programming the Mac is hard enough without having to figure everything out by yourself.... SPLAsh can provide meaningful and usable source-code examples as well as address issues relating directly to the development environments."

We agree with Greg. It's always good to see how someone else solved a problem you've been struggling with. The SPLAsh journal and code samples seem to provide another good opportunity to gain wisdom by example.

SPLAsh's annual membership costs $30 and includes quarterly issues of *THINKin' Cap*, a source-code disk, notices of SPLAsh meetings, and access to the organization through electronic information services. You can obtain more information about SPLAsh membership from SPLAsh Resources, 1678 Shattuck Avenue, #302, Berkeley, CA 94709.

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Example 1: Byte Browser's Display Routine

```
/* ------------------------------------------------------------
   drawByteIF - draws a byte document at the current scroll
   9.20.90kwgm
------------------------------------------------------------ */
static void
drawByteIF (theDoc)
   DocPtr      theDoc;
{
   register char      *p;
   register short     v, line, i, c;
   short              lineHeight, hOffset, hHex, hAscii;
   Size               fileOffset, fileSize;
   char               hexbuf [64], asciibuf [64],
                      offsetbuf [16], tmpbuf [24];
   FontInfo           fInfo;
   Handle             fileBufHdl;

   fileOffset = theDoc->fileOffset;
   fileSize = theDoc->fileSize;

   if (fileBufHdl = theDoc->contentHdl)
   {
      HLock (fileBufHdl);                    /* we will move memory here */
      p = *fileBufHdl;                       /* pointer to file data */

      printBrowserHdr (theDoc);              /* print a file header */

      GetFontInfo (&fInfo);
      lineHeight = fInfo.ascent + fInfo.descent + fInfo.leading;

      v = lineHeight * 3;                    /* leave a space at top of screen */

      /* print the file data a line at a time */
      for (line = 1; line <= 16 ; line++)
      {
         /* build file offset string and increment */
         sprintf (offsetbuf, "%05lX", fileOffset);
         fileOffset += 16;

         /* build hex and ascii strings, a character at a time */
         hexbuf [0] = 0x00;
         asciibuf [0] = 0x00;
         for (i = 0 ; i < 16 ; i++)
         {
            if (i + fileOffset < fileSize)
               c = *p++ & 0x00FF;            /* mask upper byte */
            else
               c = 255;                      /* print box char after EOF */

            sprintf (tmpbuf, "%02X ", c);    /* do hex format */
            strcat (hexbuf, tmpbuf);         /* add to hex string */

            /* ascii format */
            sprintf (tmpbuf, "%c", isprint (c) ? c : '.');
            strcat (asciibuf, tmpbuf);       /* add to ascii string */
         }

#define kLeftMargin  10                      /* left screen margin */

         /* draw a line */
         MoveTo (kLeftMargin + theDoc->curScroll.h, v);
         CtoPstr (offsetbuf);
         DrawString (offsetbuf);

         Move (fInfo.widMax << 1, 0);
         CtoPstr (hexbuf);
         DrawString (hexbuf);

         Move (fInfo.widMax << 1, 0);
         CtoPstr (asciibuf);
         DrawString (asciibuf);

         /* double-space for next line */
         v += lineHeight + fInfo.leading * 2;
      }

      HUnlock (fileBufHdl);
   }

}   /* drawByteIF */
```

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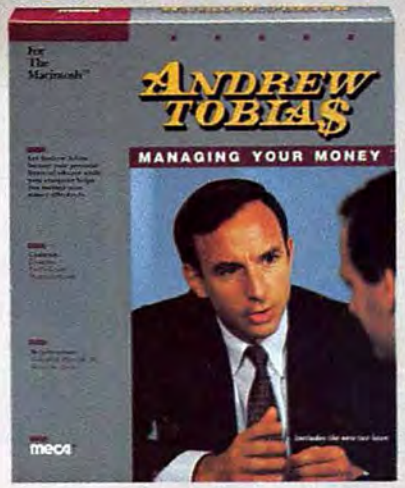
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Example 2: Open-Document-List Data Structures

```
typedef struct DocInfo {
        DocPtr  theDoc;
        short menuItem, slotNumber;
} DocInfo, *DocInfoPtr, **DocInfoHdl;

typedef struct DocList {
        short   count;
        DocInfo docInfo [1];
} DocList, *DocListPtr, **DocListHdl;
```

window, builds the menu string, and inserts the document's name into the Window menu.

addToDocList() allocates space for the new **DocInfo** record by "growing the handle," which doesn't change the handle per se but allocates more memory for the structure to which the handle refers. It then initializes the new **DocInfo** record by assigning the slot number; the pointer to the document, **DocPtr**; and the menu item of the document.

The **DocInfo** record and the document are doubly linked with data — the **DocInfo** record contains the pointer to the document, **DocPtr**, and the **Doc** structure contains the array index of the **DocInfo** record. This double link is necessary so that Byte Browser can get to the data starting from either the **Doc** structure or the open-document list. For example, when you select a document from the Window menu, Byte Browser extracts **DocPtr** from the **DocInfo** structure and then passes it to **SelectWindow**. When you close the window, Byte Browser deletes the **DocInfo** structure from the document list. It maintains the array index in the **index** member of the **Doc** structure.

Removing Documents

When you close a document, Byte Browser calls **removeFromDocList()**. This routine uses the **index** value to address the **DocInfo** data. It deletes the menu item from the Window menu with **DelMenuItem**, clears the document's slot-number bit (in **sCmdKeyMap**, the variable that holds the map of available keyboard command equivalents), and removes the **DocInfo** data from the open-document list.

The deletion of both a menu item and a **DocInfo** record causes some data misalignment, because the **menuRecord** and **DocList** structures are arrays of contiguous elements. Each **DocInfo** record contains a menu-item number that refers to its document. When the menu item is deleted, some of the item numbers stored in the open-document list are off by 1. Likewise, the values stored in a document's **index** field that refer to elements of the **DocInfo** array *above* the deleted element are also off by 1. **removeFromDocList()** fixes these two misalignments on records that have menu-item numbers and indexes greater than those of the deleted record, but it does not change array elements whose index values are less than that of the deleted record.

The Complete Browser

You really have to look at the code in DocList.c to fully understand the last paragraph, but we don't have room to print it here. Byte Browser is supplied as a complete THINK C project. You'll find this month's source code on Zmac; those without a modem can get a disk containing the code by sending a check for $10 made out to Kurt Matthies to 1150 Hancock Drive, Boulder, CO 80303.

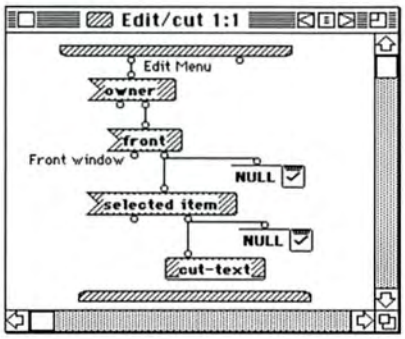
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Clipboard

One shortcoming of the Mac's Clipboard is that you can't add to it or edit it. You can create a set of macros that alleviates the problem by turning an ordinary untitled window into a quasi-Clipboard.

First, create a macro (using any macro program) to open a new document that will be "under" the document you're working on: Press Command-N, and go back to your original document by choosing it from the Window menu in the application you're using. Because both this and the macro that follows depend on mouse position, make sure your untitled document is below the original one on the Window menu. (Unless the filename begins with a letter that comes after *T*, just leaving the Untitled name is OK.) This untitled hidden window is your new Clipboard.

Next, create a macro that copies text from the original document: Press Command-C, select Untitled from the Window menu, then press Command-V, and finally select the document you are working on from the Window menu. You can create a separate macro that cuts from the original, by substituting Command-X for Command-C in the sequence.

Tip of the Month

Spot-Color Proofs

The advent of color electronic page makeup has highlighted a problem that most software manufacturers have overlooked. The problem occurs when you print a spot-color composite to a low-resolution (300 dpi) black-and-white printer for proofing. If you compose a document using spot-color components from a page-makeup program such as PageMaker or QuarkXPress and place color graphics from Illustrator 88 or FreeHand, the printer driver assigns a percentage of black to represent the differences between colors. This is fine for proofing a color break, but it makes copy on the page (and within graphics) very difficult to read. QuarkXPress offers the option of printing colors as grays or in black-and-white, but this option has no effect on color EPS files placed on the page.

Solution: Tell the printer to use a screen ruling too high for it to reproduce (150 lines per inch, for example, for a LaserWriter or other 300-dpi device). When the page comes out of the printer, the tinted areas fill in to black (see Figure 1).

To achieve this effect in QuarkXPress, simply set the screen ruling in the Page Setup dialog box to the desired value.

The process is more involved for PageMaker. You must open the APD (Adobe printer description) file for the appropriate printer and edit it with a word processor. Remember to save the APD file as a text file under a different name (LW II NTX composite.apd, for example) so the original remains unchanged. You need to locate the lines listed below and change the screen-frequency values indicated in bold to the appropriate values:

```
@DefaultScreenFreq: "150"
@DefaultScreenAngle: "45"
@DefaultScreenProc: "{dup mul
exch dup mul add sqrt 1 exch
sub)"
@ScreenFreq: "150"
@ScreenAngle: ""
@ScreenProc: ""
```

Remember, this procedure turns almost every percentage tint in a document to solid black, so it doesn't work in situations involving background tints, process color photos, or tint builds.

Steve Zenger
Buffalo, NY



Figure 1: Proofing color material with tinted text on 300-dpi-printer output can strain the eyes, as shown by the top example. But a simple trick in setting the line resolution can bring things into focus.

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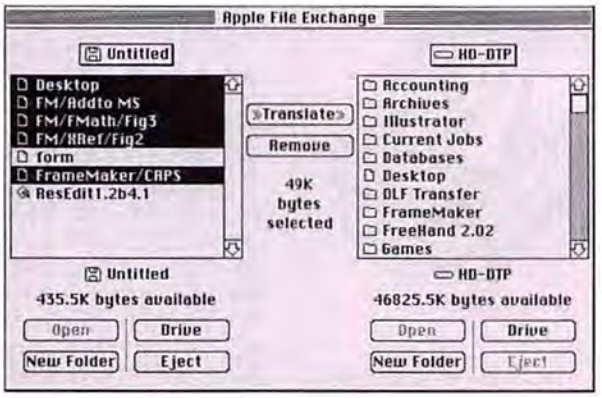


Figure 2: Although AFE is commonly used to translate files from one computer format to another, you can also use it to recover files from damaged disks.

The Copy macro, which I call Library Paste, is especially handy for selecting items from a long general list (such as a large bibliography) for inclusion on a specialized list. The Cut macro, which I've named Gather, is useful for collecting and moving material in a document. As a companion to the Gather macro, you might want to create a fourth macro, Spill, that places the newly assembled information in your document at the desired insertion point and empties the fake Clipboard. Before beginning to record the macro, click on the insertion point and select Untitled from the Window menu, press the command that selects all in the application, press Command-X, select your original document, and press Command-V.

Megan B. McClard
Denver, CO

Apple File Exchange

Occasionally the Desktop file on a floppy disk will become damaged so that it can't be rebuilt in the usual way. You can tell that the file is damaged when there is a long pause after you insert the disk into the drive, followed by an alert dialog box that says the disk needs minor repairs and asks if you want to repair it.

If you click on OK to repair the disk, however, the head shuffles around a bit and the disk is ejected without being read.

A member of our faculty had this problem with a very important document disk that, of course, had no backup. Several disk-recovery utilities were used without success. I managed to retrieve all the files, not with an expensive recovery application but with an application, AFE (Apple File Exchange), that comes free with the System software (see Figure 2).

I launched AFE, hoping that it would be able to read the files even though the Desktop file had been trashed. The entire file list appeared, and I was able to transfer all the files safely off the damaged disk. Other programs could probably do the same, but AFE is fast and efficient — and the price is right!

Bruce A. Carter
Boise, ID

Word 4.0

Do you want to sort a mail-merge data file by zip code when the first field is LASTNAME and ZIPCODE is somewhere in the middle of the record? You can try using Option-drag to select just the ZIPCODE column. You need to set your tabs so that all the zip codes are left-aligned in a column (see Figure 3). Hold down the Option key as you drag the mouse to highlight

LASTNAME¶	FIRSTNAME¶	STATE¶	ZIPCODE¶
Doe¶	John¶	OH¶	44606¶
Muezza¶	Albert¶	CA¶	95018¶
Smith¶	Mary¶	WA¶	96013¶
Martin¶	Jane¶	NY¶	10023¶
Valdez¶	Pedro¶	FL¶	33045¶
¶			
LASTNAME¶	FIRSTNAME¶	STATE¶	ZIPCODE¶
Martin¶	Jane¶	NY¶	10023¶
Valdez¶	Pedro¶	FL¶	33045¶
Doe¶	John¶	OH¶	44606¶
Muezza¶	Albert¶	CA¶	95018¶
Smith¶	Mary¶	WA¶	96013¶

Figure 3: Word 4.0's Option-drag feature not only highlights columns of text but also helps you sort a document.

the desired column of text.

Once you've selected a column of text, using the Sort command sorts the records based on the first word of each line in the selected column rather than on the first word of each paragraph in the data document. And remember *not* to select the field name at the top of the document.

Jungle Payne
Santa Barbara, CA

PageMaker 4.0

PageMaker 4.0 has enhanced exporting features for text, which can be a boon if you need to compress and save documents created in older versions of PageMaker. These documents are most likely large, and the formatted text sections are probably the most important part. If this is true, then translate the document created with PageMaker 3.0 or 3.02 up to version 4.0.

Now you can export the documents (you can combine them by cutting and pasting) into a document that's formatted in your favorite word-processor style (or text only). This technique might save you 100K on small documents and as much as megabytes on large ones.

If you ever need your older document again, you'll find that reassembly is easy. Other exporting programs can perform this trick as well, but PageMaker documents save you the largest amount of space when you remove the formatting.

David Smith
Georgetown, TX

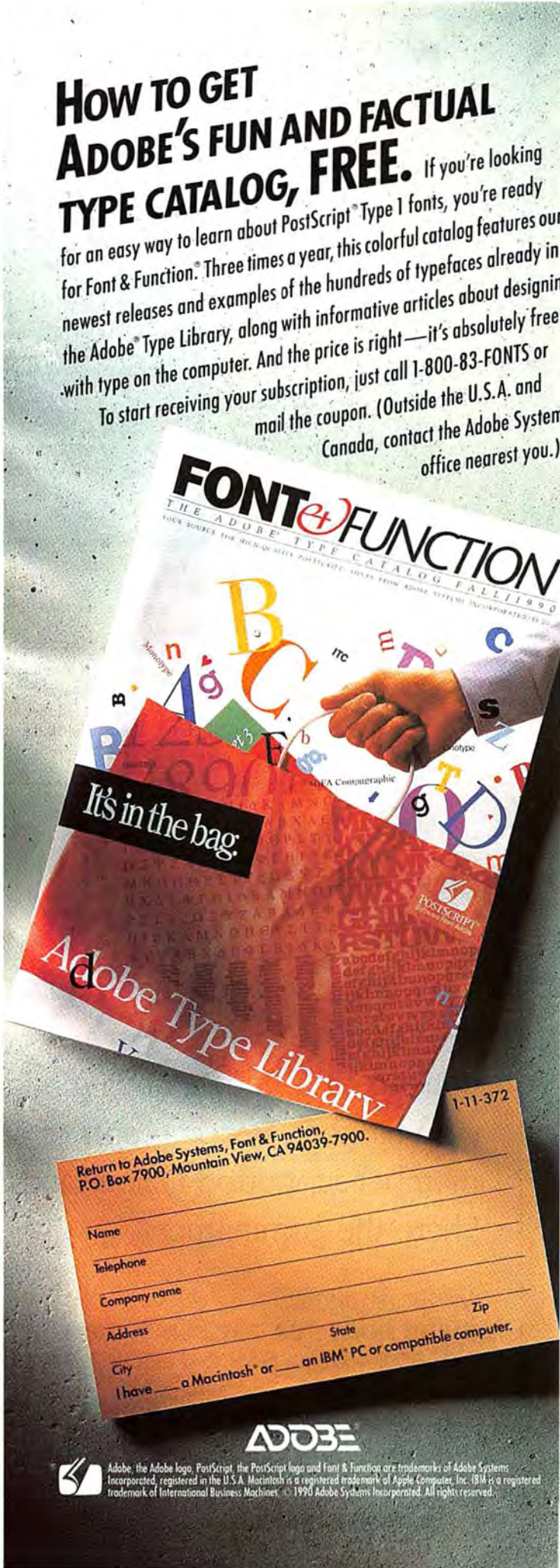
Canvas 2.1

Macintosh users know about the problems with quality that can occur when MacDraw or similar graphics are pasted into other applications. Many things such as alignment and line weights go haywire when you print. If you own Canvas Separator, you may have a solution right under your nose.

1. Open the original graphic in Canvas.

2. Save the graphic in Canvas format.

3. Use Canvas Separator's Convert command (see Figure 4) to convert the file into a suitable format, such as EPS



PICT or EPS Illustrator.

4. Finally, import the file into your page-layout or word-processing package. More often than not, the problems will vanish.

Jeff Harris
Leesburg, VA

Mouse

Here's a low-tech way to transform your bulky mouse into a halfway decent tracing tool.

Let's say you want to draw something moderately difficult such as a map of Jamaica to include in a letter with directions to your estate in Spanish Town (don't you wish!).

1. Get a paper clip. (Mac tips don't come much simpler than this.)

2. Bend the clip so that one end comes away from the rest at 90 degrees. Bend that point down 90 degrees.

3. Tape it to the top of your mouse.

4. Use the overhanging end of the paper clip to trace the map from an atlas or a map of a decent size. The mouse will "draw" along. The flatter the surface, the better. It takes a little practice, but it works and enables someone with no artistic flair to do a fairly creditable job.

Barry Lazar
Montreal, Quebec
Canada

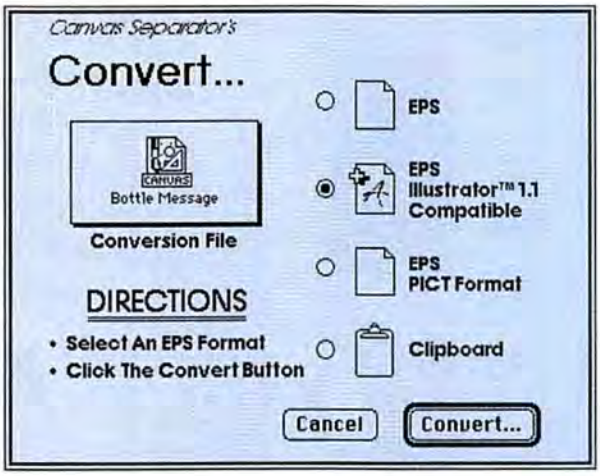


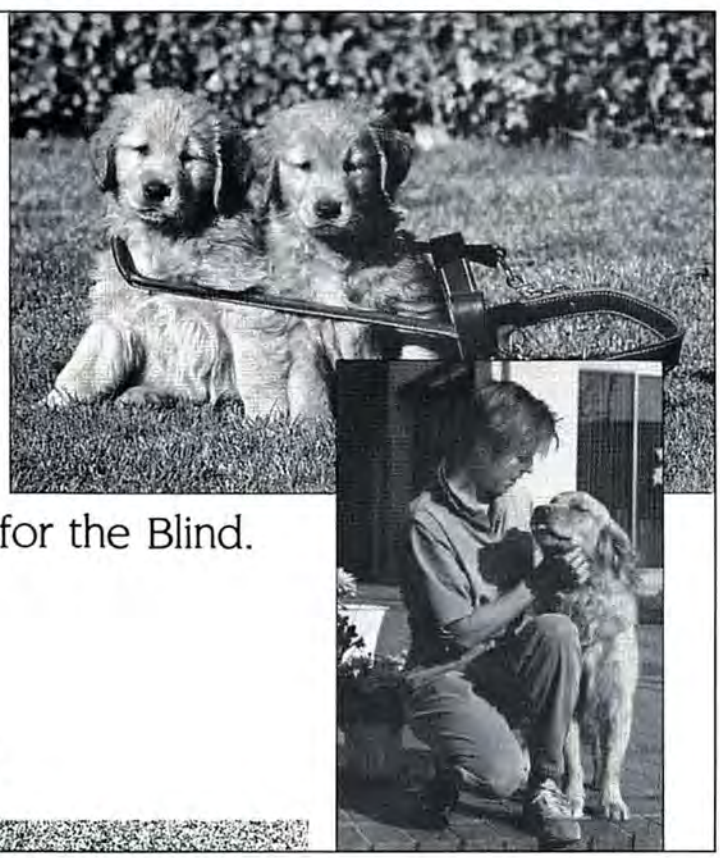
Figure 4: Canvas Separator can help you export troublesome draw graphics into formats that mesh more successfully with page-layout programs.

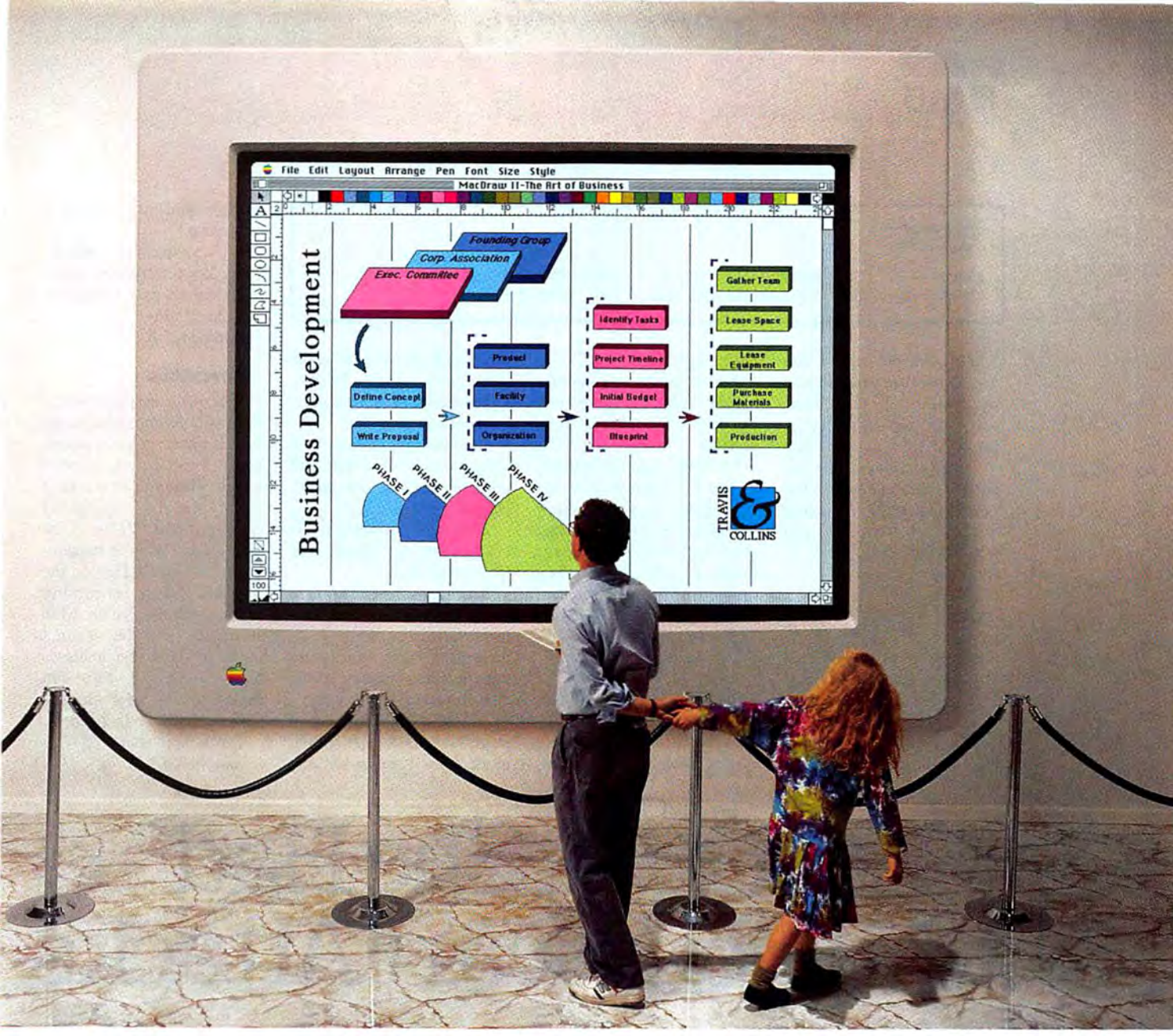
Word 4.0

Most database programs can export to PageMaker (and other desktop-publishing programs), but formatting text with anything but paragraph-based styles is difficult. (For example, you might want one

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Example 1

```
Name        tab   Address              tab   Phone no   CR
J Smith     tab   14 Becksworth Rd.    tab   898 5555   CR
```

field to come out in bold, one in italic, and one in a different font than the rest). The answer is to use Word's mail-merge function. Format the main document as desired, using the field names from your database; for example, you could boldface the name field and italicize the phone field, as shown here:

«DATA Data document»
«**Name**» tab «Address»
tab «*Phone no*»

Export your database to a tab-delimited ASCII file, and set this exported file up in Word as a data document. Then you can enter the field names in the data document as in Example 1.

Make sure that no commas appear within the fields (you can search for commas to be certain).

Go to the main document, choose Print Merge from the File menu, produce a new document, and use the Change command to get rid of the page breaks between entries. You can now import the formatted Word document into PageMaker or any other page-layout application.

Owen Watson
Wellington, New Zealand

Word 4.0's outline feature is frequently underused, probably because most people don't make outlines. But this feature can be helpful for more than outlining.

I use the outline feature to jump quickly to a specified place in a long document. Here's what I do:

1. Select Outlining mode (Command-U) from the Document menu.

2. Click on the line or paragraph you want to go to (collapsing or expanding as needed). In effect, you're creating a kind of bookmark by entering an insertion point.

3. Choose Outlining again to go back to normal editing mode. Now your cursor is at the right spot, but it's probably off-screen.

4. Press the right- or left-arrow key to scroll the document to the cursor's location.

Colin H. Bay
Portland, OR

PhotoShop

When you are using one of the functions under the Image Adjust menu, you can toggle between the current adjusted image (while you are working on it) and the original by clicking on the title bar of the dialog box. What is happening is that by clicking on the title bar, you are temporarily turning off the Video LUT animation and the original image (without adjustment) is being displayed. This can make minor adjustments easier to assess on-screen.

Dawn Applegate
San Mateo, CA

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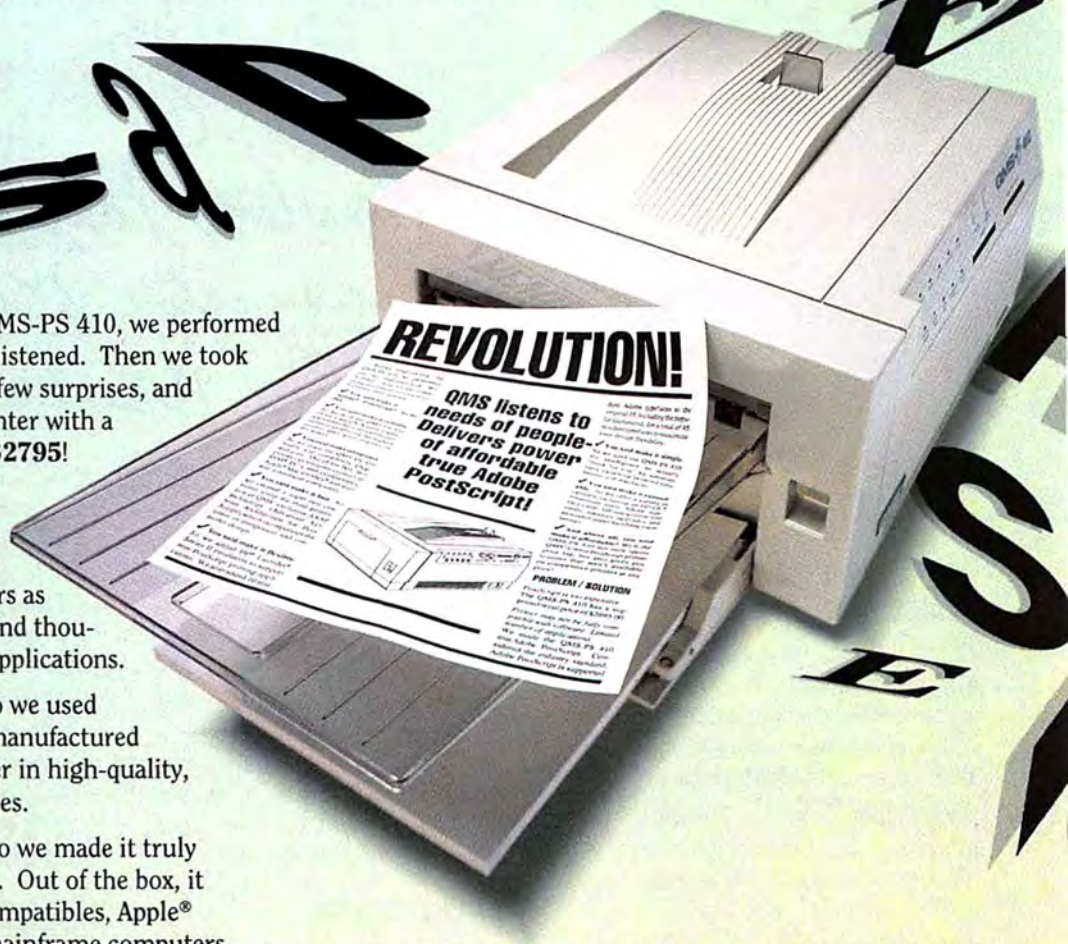
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Don't want to wait for an answer? Post your question on Zmac, MacUser's *on-line service, and get a reply from Bob, Andy, or one of the other* MacUser *experts. See the masthead in this issue for instructions on how to sign up.*

By Bob LeVitus and Andy Ihnatko

DOS on a Mac

Q. What are the minimum additions (software and hardware) that I need for my system so that it can run programs created by DOS computers?

I have a 1987 standard Mac SE with 1 megabyte of RAM. I'd like to be able to run and modify some DOS programs such as dBASE III PLUS and Lotus 1-2-3 and their files.

John Dabbas
San Diego, CA

Bob: *First, you need a program called SoftPC, from Insignia Solutions. You have to upgrade to at least 2.5 megabytes of RAM to run it, but I recommend that you get a full 4 megabytes for the best results. That solves only half of your problem, though, because your SE doesn't have the DOS-reading SuperDrive that's standard equipment on all new Macs. Believe it or not, your SE is so antiquated that it lacks the SWIM chip that would enable it to use Apple's new cheap external SuperDrive. However, you can get a 3.5-inch and/or 5.25-inch SCSI floppy drive called the DaynaFile from Dayna Communications (*MacUser *gave it five mice back in October '89 — "PC to Mac and Back," page 143) that will work just fine.*

Mac II in Stereo?

Q. How can I get my Mac II to play stereo sounds? I'm using my Walkman headphones, and all I get is mono.

A. Z. Brabbit
Tampa, FL

Andy: *The headphone jack at the back of your Mac II (dang . . . spoiled the rhyme) is indeed a stereo jack, and it will treat you to big-time stereo sound if your Mac recorded the sound in stereo. However, the Mac pumps out 99 44/100 of its sounds the easy way — in mono — so that's how they'll be played back.*

Bob: *Don't give up, though. Apple seems to think that the added sound capabilities of its new Macs (and the increased functionality of the Sound Input Manager) might change the stereo status quo and let you record in stereo. So hang on to your headphones.*

What's My Contour Line?

Q. I'm looking for a program that can create topographical maps and let me zoom in and out and view them from any angle. I've got a IIcx, so I shouldn't have a problem with number crunching. Any suggestions?

Paul W. Moore
Minot Air Force Base, ND

Andy: *If you have a spreadsheet program with decent graphing capabilities, such as Wingz or Full Impact, you might not need a special program. If you have all the elevation data for the area, all you need to do is plug the data into a spreadsheet as a 2-D table and have the program create a 3-D surface graph from the data. You'll be able to make all kinds of modifications — zoom in or out, rotate around the area, change the viewing angle — from the spreadsheet (see Figure 1).*

Bob: *Andy's method is a good one if you've already shelled out for a spreadsheet program that can handle 3-D graphs, but I've got another, more sophisticated solution. RockWare, Inc., of Wheat Ridge, Colorado, has a $400 gridding, contouring, and base-map-plotting program called MacGRIDZO that might be exactly what you're looking for. Call RockWare at (303) 423-5645 for more information.*

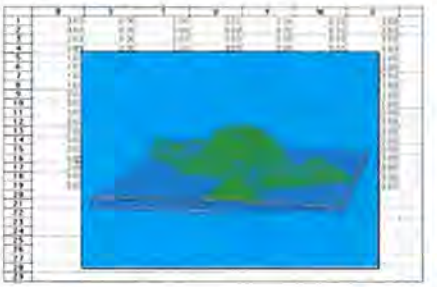


Figure 1: A 3-D map created from elevation data with Wingz. (Note: For best results, get Apple to lend you a IIfx before plotting stuff like this.)

Vaccine Redundant?

Q. I installed Vaccine 1.1 on my hard disk to help guard against viruses. I also recently purchased Symantec's SAM, because it seemed a little more comprehensive. Is the old Vaccine now redundant and just taking up space?

Steve Jones
Jefferson City, MO

Bob: *Yes, it's redundant.*

Andy: *Not only that, but it also does the same thing as SAM.*

A Faster Plus

Q. A dealer told me that an accelerator would speed up my Mac Plus, except for calculations (which don't matter to me anyway). Another dealer said an accelerator wouldn't help that much and could cause overheating. I do a fair amount of word processing and keep several large databases.

Ronald Hultine
Apple Valley, MN

Andy: *Adding memory is never a bad idea, but it won't make your pokey Plus run any faster. Buying an accelerator will (and that includes moving between applications). The wireheads at MacUser Labs, who live to answer these sorts of questions, reported in*

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GO ZMAC and discover

Any CompuServe subscriber can access Zmac by typing GO ZMAC at the exclamation point (!) prompt. If you don't subscribe to CompuServe, sign up for Zmac on-line by following these directions.

You'll need a modem and telecommunications software. Set your format for 8 bits, one stop and no parity.

Find your local access number:

Dial 1-800-FIND CIS (346-3247). When connected, press RETURN.

At Host Name prompt, type PHONES.

Follow instructions to locate access numbers in your area. Hang up.

Signing up for an account

Dial up using your local access number. When connected press RETURN.

You'll see the following prompts on-screen. Your responses are printed in bold.

Host Name: **CIS**

User ID: **177000,5200**

Password: **Z*MAC**

Agreement Number: **Z12D0890**

You will then be prompted for additional information including a credit card number for billing purposes. If you cannot bill to a credit card, call the CompuServe Customer Support line listed below.

Your new Zmac ID and password will be displayed on-line. Call again and explore Zmac. A new password will arrive in the mail within 10 days.

For assistance in membership, billing or passwords call CompuServe Customer Support at (800) 848-8990.

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August '90 ("Chasing the IIfx: Accelerators," page 84) that the Gemini Series by Total Systems ($1,895, without a floating-point coprocessor) was the best bet for people such as you (and me) who appreciate the Zenlike simplicity (but not the speed) of a good old-fashioned Plus. Call Total Systems at (800) 874-2288.

Bob: *You say you're keeping some large databases? In his zeal for Zen, Andy forgot to mention that database programs* love *extra memory even if it doesn't make your computer go any faster. That's because keeping more data in memory reduces the number of times that your program has to access the hard disk. Someday somebody will invent a database program that* never *accesses the hard disk, and all the world's problems will be solved. In the meantime, you might consider investing in a faster hard drive* and *some more memory.*

Bite the Bullets

Q. Is there an easy way to generate filled-in bullets (•) without relying on a special font set?

Bennett Egeth
Address Withheld

Andy: *I'd better bow to Bob's superior technical savvy on this one!*

Bob: *OK, the answer to the question is trivial (Option-8 will get you a bullet in almost any font), but I'll also point out that there are a lot of useful Mac typographic features that new users don't know about or don't understand how to use (such as smart quotes, accents, and ellipses). These little touches set the Macliterate writer apart. It's kind of like knowing which fork to use at a dinner party. I've run across a new book by Robin Williams that gathers all this lore into one small, easily digested package called* The Mac Is Not a Typewriter *(Peachpit Press, $9.95).*

New Macs Unstable?

Q. When I traded my reliable SE for my current IIci, I didn't imagine the trouble I was headed for. I knew many games wouldn't work, but I didn't count on the blasted instability of the thing.

Part of the problem was a virus (since eradicated).

What I'm looking for is a concise list of error- and bomb-code definitions. Any suggestions?

R. Eggersman
Everett, WA

Bob: *Macintosh guru and Pyro! coauthor Bill Steinberg wrote a DA called System Errors DA that contains just what you're looking for (see Figure 2). You can't order it directly, but you can download it from Zmac or from CompuServe's MAUG forum (where Bill's a sysop).*



Figure 2: System Errors DA pops up a scrolling list of Macintosh error codes.

I know what you mean about upgrading to a new, state-of-the-art CPU. Apple recently lent me a IIfx, and although it's easily the best Mac I've ever used, I had a couple of incompatibilities that were nearly impossible to track down.

For example, when I first got the IIfx, Word and PageMaker froze as soon as I launched them. By trial and error, I discovered that if I didn't use Suitcase II, they launched perfectly. I posted a note in the Fifth Generation Systems Support forum on CompuServe asking if anyone else was having the same problem. Nobody was. I was stumped until Bill Steinberg suggested I check all the files I was opening with Suitcase — perhaps one of them had become corrupted. Bingo. It turned out that I had a corrupted font file. After I'd replaced it from the locked master disk, everything worked fine.

Don't give up. Keep trying different combinations of things — remove INITs or cdevs you think might be causing problems, call manufacturers if their products aren't working right, cry for help on CompuServe or Zmac, or consult your local user group. Once you've gotten your IIci environment stabilized, I guarantee that you won't miss your SE at all. I used to have a plain-vanilla Mac II. Now that the IIfx has settled down, I wouldn't dream of going back to the old Mac II.

Andy: *Oh, cry me a river, Bob. Pukes with 40-megahertz machines and 32 megs of RAM deserve to suffer a little. And people who get those systems for free deserve to suffer a* lot.

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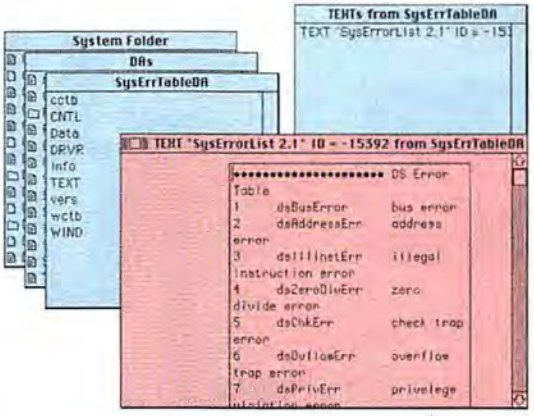


Figure 3: Extracting the text from System Errors DA, using ResEdit

down system crashes, though. Nine times out of ten, it's an INIT or a cdev gumming up the works, and if you just keep turning off INITs one by one, you'll probably track down the culprit.

As for the System Errors DA, well . . . it's nice, *but you have to have a* working *Mac before you can use it! I prefer to keep a printed list of codes tacked up by my desk.*

***Bob:** And here's how to do just that, if you have a copy of ResEdit (see Figure 3). First, make a copy of the System Errors DA. (Always work on a copy when you're using ResEdit — it can do nasty things to a file.)*

Launch ResEdit, and double-click on the System Errors DA. In the window that opens, double-click on the TEXT item. Now double-click on TEXT "SysErrorList 2.1" ID= -15392 (it may have a slightly different name if you have a different version of the DA).

Next, select all the text by either dragging from the beginning to the end or clicking just before the very first character (it's a bullet in Figure 3), scrolling to the end of the text, holding down the Shift key, and clicking after the very last character. Select Copy from the Edit menu. Now quit ResEdit, launch your favorite word processor, and paste. You now have a text version of the error codes.

The Upgrade Path

Q. I'm thinking of getting a Mac II and would like to upgrade eventually to a IIfx. What is the best hardware configuration (monitor, color board, RAM, keyboard, and so on)?

Matthew Micka
Cooperstown, OH

***Andy:** I'm thinking of upgrading to a IIfx too; I'm going to steal Bob's. But back to your problem — it doesn't matter what peripherals you buy for your II. Any monitor, keyboard, or color board that works in the II will also work in the IIfx, so buy the best stuff you can afford that fits your needs. As for RAM, any memory that you buy for your II will be utterly useless in the IIfx, because the latter machine uses fancy-shmancy 80-nanosecond chips that won't fit, much less work, in your II. So buy as little RAM as you can to get by until you upgrade, and start buying lottery tickets.*

Dedicated Phone Line?

Q. Recently I bought a fax machine and a modem for my house. The salesman at the store where I bought the stuff says I need to have extra phone lines for the things, but I hardly want the house wired up like the American Embassy! Do I really need all these phone lines?

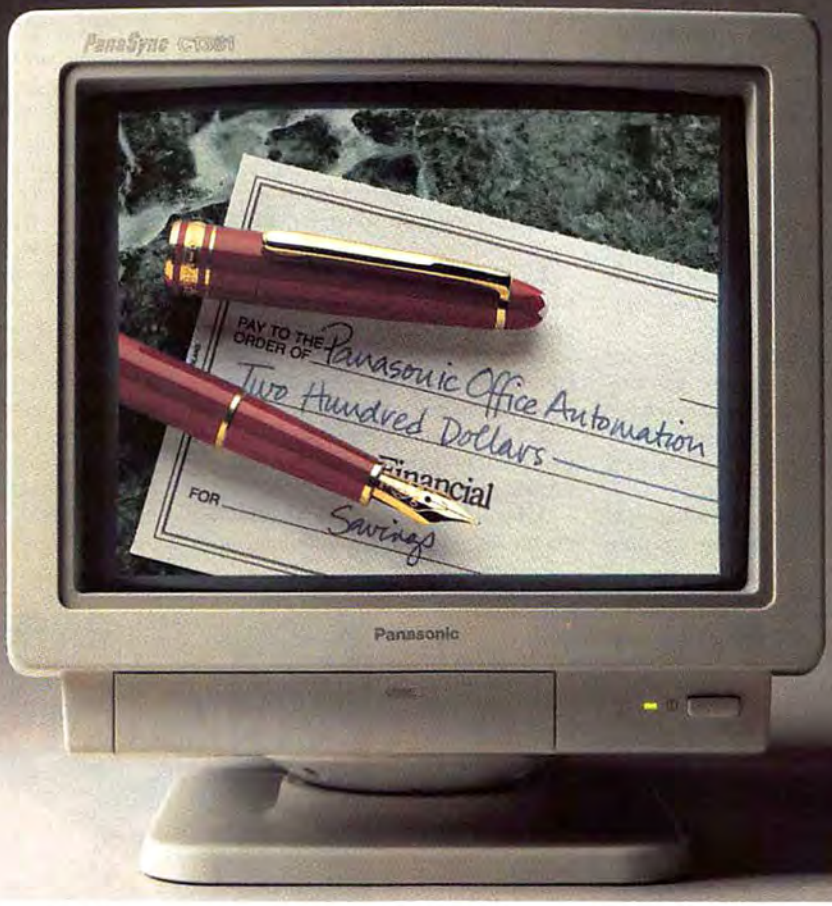
Jodie Zechowy
Ludlow, MA

***Andy:** Technically speaking, no. A phone line is a phone line, and the hardware you mention is perfectly happy wherever it can find a dial tone. A second phone line is a necessity if you intend to keep things running 24 hours a day (if you're running a BBS or want to keep the fax machine on 24-hour standby), unless you're absolutely sure no one will want to engage you in analog telcom (nerdspeak for "talk to you on the phone").*

You may consider adding a second line for purely anthropological reasons, however, particularly if you have roommates. See, the usual way that human beings check to see if another human is using the phone is to pick up an extension and shriek, "Hey, anyone on the phone?!?" This has the effect of sliming whatever data is coming across the phone line at the time and making your modem very angry with you. Another problem

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M3-MAC

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with voice/data cohabitation is Call Waiting. That's the feature that allows you to be just as rude to callers with your one-line phone as you can be with a two-line phone, without any extra hardware. When you hear a beep on the phone, you know another call is coming in. Unfortunately, this beep is to modems what garlic is to vampires. One beep, and your modem runs screaming into the night, terminating its connection (and whatever file transfer you had going at the time).

You can deal with such problems without buying a second phone line, of course. Personally, I just hang sticky notes on every telephone in the house ("I'll give you a dollar if you don't pick up this receiver") just before I begin a telecommunications session.

*You can temporarily switch off call waiting in most parts of the country by dialing * 7 0 before dialing the number you want to connect to. Call waiting will be reactivated as soon as your modem hangs up.*

Another solution is to buy a bunch of "privacy switches," little boxes you plug into every phone jack in the house. Then, whenever your modem goes off-hook, all the other receivers go dead. Radio Shack sells its Teleprotector (stock #43-107) for just $7.95 — if you put them onto two or three phones, it's a lot cheaper than a second phone line.

A 75-Percent Solution

Q. I have a Mac SE with an internal hard-disk drive and an ImageWriter II. I do 99 percent of my work with Microsoft Works 2.0, and 75 percent of that is word processing. I do very little work with graphics. I could use some advice in three areas:

1. I like to use at least 7 inches of text width on a standard 8.5-inch page. How can I easily (cheaply) get it all onto my screen simultaneously without having to contend with scroll and wrap-around? Do I have to buy a monitor?

2. I want better printed resolution of the few Works fonts I use, as when I'm upsizing italics.

3. I would like to be able to print one document while I am simultaneously working on another document.

Gifford T. Jones
Kirkland, WA

Bob: *Let's take these one at a time.*

1. *The least expensive solution would be to install Stepping Out II (Berkeley Systems, 1700 Shattuck Avenue, Berkeley, CA 94709; [415] 540-5535). It has a reduction mode that lets you work on your document at 75 percent of its true size, which would give you your 7-inch margins. Unfortunately, it also makes on-screen type hard to read, especially if you use small type — 12 point or smaller — to begin with. As you probably compose letters in 12-point type, this probably isn't the optimal solution for you.*

Why not consider a single-page monitor? They're not as expensive as you might think. I just got a Mirror PixelView II (two-page) display, and it performs admirably, especially considering that it's less than half the price of the Apple Two-Page Display. The PixelView I — Mirror's single-page display — sells for less than $600. The company even offers a 30-day "love it or return it" guarantee.

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3. Frequency of Issue	3A. No. of Issues Published Annually	3B. Annual Subscription Price
Monthly	12	$27.00

4. Complete Mailing Address of Known Office of Publication (Street, City, County, State and ZIP+4 Code) (Not printers)
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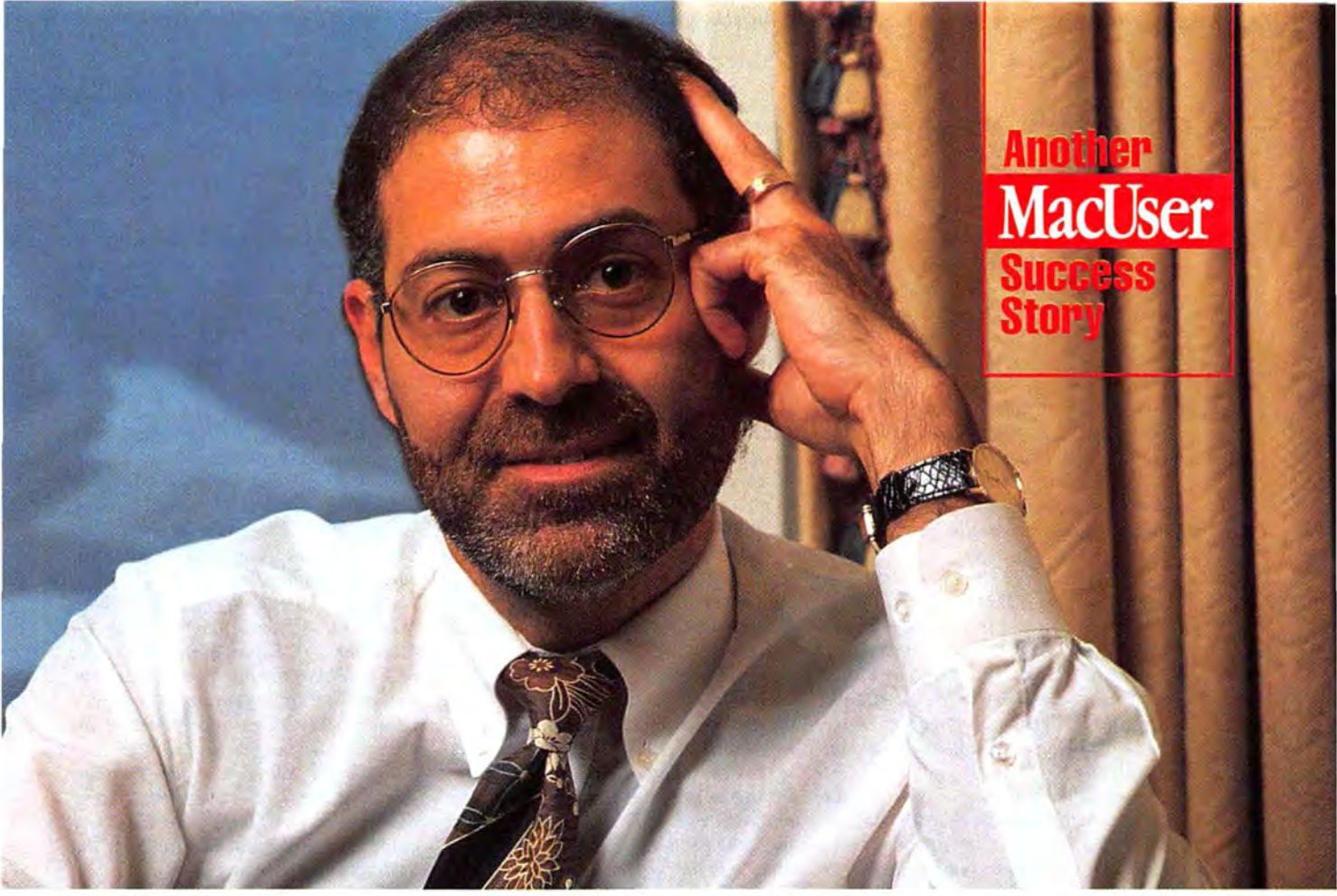
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2. Try Adobe Type Manager (Adobe Systems, 1585 Charleston Road, Mountain View, CA 94039; [415] 961-4400). Although it will slow down your SE a bit, it'll usually give you better output on your ImageWriter, no matter what type size you select. It should also improve the appearance of italics. Added bonus: It makes odd-sized fonts—such as 11 or 13 point—look better on-screen.

Now for the drawback: It only works with PostScript fonts, so you'll probably have to buy some if you don't already own any.

3. SuperSpool (Fifth Generation Systems [504] 291-7221) is a print spooler that lets you print to an ImageWriter while continuing to work on another document. Be advised that your Mac's performance will be degraded slightly while the file is printing, but if you're like most people, you'll find the trade-off acceptable.

***Andy:** Have you ever considered that the upcoming release of System 7.0 might solve your font woes? Outline fonts (the same sort of technology ATM uses) will be an integral part of the new System, but unfortunately the new font format will be incompatible with your current fonts and also incompatible with PostScript (ATM) fonts. My advice: Get ATM. It does a good job, and it's pretty affordable. It does ship with some standard Mac PostScript fonts (such as Times and Helvetica, which are practically all you would need if you were publishing, say,* MacUser*) to get you started.*

Custom Startup Screens

Q. I've seen Macs on which instead of a "Welcome to Macintosh" message, people see the Batman logo when they start up. How can I do this on my machine?

Mike Schuster
New York, NY

***Andy:** That's what's known as a StartupScreen, and setting one up is pretty simple. First, contact DC Comics, owner of the Batman logo, and ask for a limited license to use and reproduce its trademarked property. This shouldn't cost you more than $20,000. Scan the logo into a MacPaint file.*

Next, the MacPaint file has to be converted to a StartupScreen. Many paint programs can do this conversion for you, but there's a shareware program called ViewPaint that can do the job just as well. Just drag the resulting file (named StartupScreen) into the System Folder, and you're done.

As far as I know, this technique works with all comic-book characters.

***Bob:** As long as you plan to use the logo on your own machine and not sell it, you can skip the step where you pay DC Comics. (Sorry, Andy, you should have saved that money for a IIfx.)*

Another thing: You can create the logo from scratch in any paint program — MacPaint 2.0, SuperPaint, UltraPaint, or PixelPaint, for instance — that supports the StartupScreen format. You don't have *to mess with a scanner if you've got even a modicum of artistic ability.*

Finally, if you have a color-compatible Mac, you can even have a color StartupScreen. All you have to do is use a color *paint program that supports the StartupScreen format.*



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Find your local access number:

Dial 1-800-FIND CIS (346-3247). When connected, press RETURN.

At Host Name prompt, type PHONES.

Follow instructions to locate access numbers in your area. Hang up.

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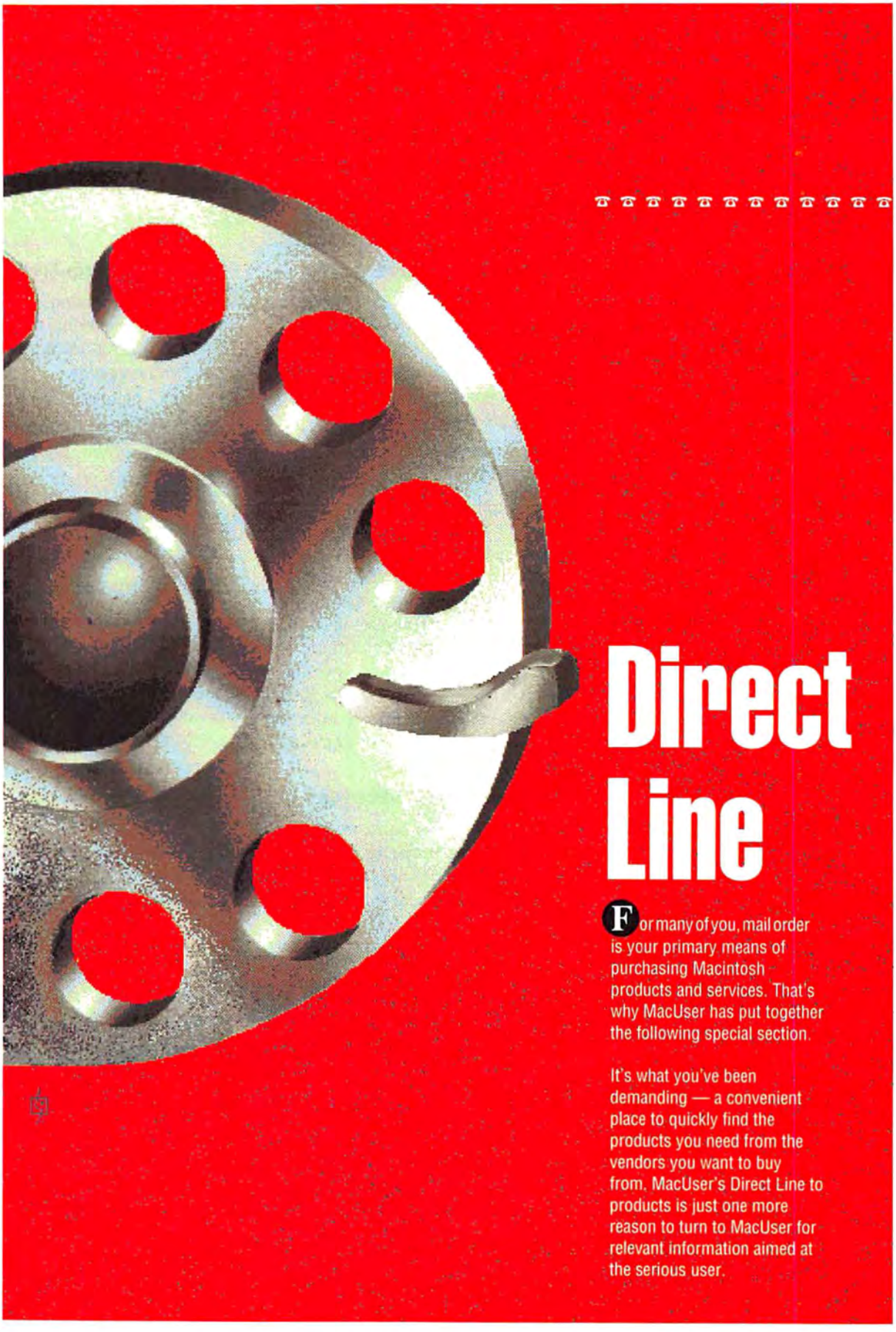
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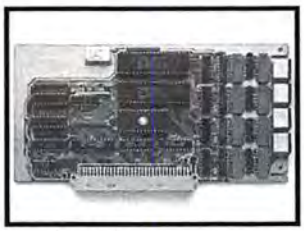
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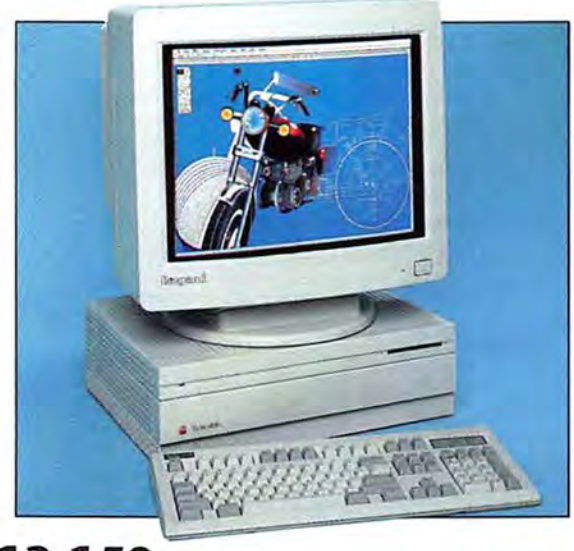
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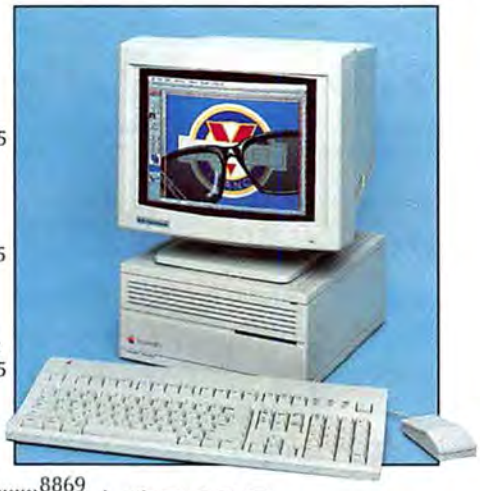
Mac IIsi B&W Full-Page System, 5 Mb RAM, 40 Mb Hard Drive, Mac 101 Keyboard.....3795

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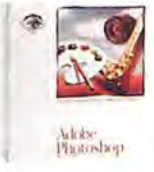
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Read It! (OCR)	260
ReadySetGo! 4.5	285
Write Now 2	122

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RS#	ADVERTISER	PAGE
139	Abacus Concepts, Inc.	72
61	Abaton	59
128	Abbott Systems, Inc.	4
N/A	Adobe	267
90	Advance Business Center	303
411	Advanced Software, Inc.	10
106	AEC Management Systems, Inc.	230
183	Aladdin Systems, Inc.	246
N/A	Alliance Peripheral Systems	322-323
71	ALSoft, Inc..	257
394	Altsys Corporation.	248
418	Animas	271
70	Applied Engineering	143
88	Articulate Systems.	27
37	Asante	219
110	Banner Blue	36
N/A	Bottom Line Distribution	321
42	Caere Corporation	150-151
407	Cambridge Computer (ERI Direct)	320
105	Cambridge Group	266
412	Canon U.S.A., Inc.	202-203
420	Caravelle Networks Corporation	34
113	CDA Computer Sales	135-137
99	CE Software	40
N/A	CheckFree Software	64
82	ChipSoft	116-117
N/A	Claris	153-155
N/A	Claris	269
N/A	Claris	75
120	CompuServe	259
64	Computer Friends, Inc.	252
22	CoStar Corporation	28
23	CoStar Corporation	29
360	Custom Applications, Inc.	58
138	Dantz Development	252
147	DataViz	216
371	Deltaic Systems	325
121	Diskette Connection	320
44	DPI	111
161	Dr. Mac	306-307
395	Dubl-Click	250
151	E-Machines	30
168	Eastman Kodak	264
125	Ehman	232
177	Ehman	C3-C4
176	Ehman	C5
154	EMAC	5
35	ERI Direct	286
80	Farallon	C6
157	Fifth Generation	56
60	Fifth Generation	251
377	FM Waves	325
8	FWB Software	73
95	GCC Technologies	129
96	GCC Technologies	131
97	GCC Technologies	133
366	GEnie	244
372	Global Village Communication	204
N/A	Hard Drives International	300-301
45	Hardware Express	302
417	Hayes Microcomputer	113
N/A	Hewlett-Packard	82-83
N/A	Hewlett-Packard	84-85
N/A	Hewlett-Packard	86-87
N/A	Hewlett-Packard	88-89
N/A	Image Club Graphics, Inc.	240
152	Insignia Solutions, Inc.	115
363	International Business Soft.	326-327
N/A	Intuit	25
114	IOMEGA	8-9
199	Jasmine Technologies	253
N/A	Kensington Microware	231
N/A	Kensington Microware	233
397	KiwiSOFTWARE, INC.	218
398	KiwiSOFTWARE, INC.	6
414	La Cie	68-69
N/A	LaserMAX Systems	207
14	Lifetree Software	24
165	Mac and More	302
N/A	MacAvenue	223-228
N/A	MacAvenue	90-91
163	MacCenter	287
N/A	MacConnection	46-55
375	MacDepot	304-305
27	MacFriends	205
28	MacFriends	241
29	MacFriends	256
166	MacFriends	77
50	MacLand	296-299
132	MacProducts USA	308-309
N/A	Mac's Place	310-317
39	MacTel Technology Corp.	324
153	MacWarehouse	184-193
N/A	MacZone	16-23
368	Magic Software	286
46	Meca	261
85	Merritt Computer Products, Inc.	280
77	Microcom, Inc.	44
118	Microcom Software Division	208
123	Microcom Software Division	209
136	MicroNet	194
137	MicroNet	214
N/A	Microsoft	C2-1
N/A	Microsoft	234-235
N/A	Microsoft	78-79
129	MicroSpeed	167
127	Microtech International	254
190	Microtek Lab, Inc.	171
107	Mirror Technologies	80-81
111	Mirror Technologies	247
109	Mirror Technologies	249
67	Mobius Technologies, Inc.	71
378	Multi-Ad Services	199
83	NEC Home Electronics	60-61
370	Newbridge Microsystems	123
43	Newer Technology	70
54	NewGen Systems Corporation	37
55	NewGen Systems Corporation	37
104	NoRad Corporation	76
130	Odesta	44
357	Ontrack Computer Systems	325
404	Opcode	74
N/A	Oracle	11
58	Orange Micro	32
170	Panasonic	279
134	Peachtree Software	35
81	Personal Training Systems	15
68	PLI	98-99
133	Portfolio Systems	14
65	Preferred Computing	286
174	Prometheus Products, Inc.	183
143	QMS	274
410	Quark	236
142	Radius	38-39
N/A	RasterOps	212-213
408	Reality Technologies	145
56	Reference Software	26
150	Safeware	320
20	ScanCo	238
33	Sensible Software, Inc.	67
N/A	Shiva	7
38	Softview	42-43
160	Software That Fits	288-291
60	SuperMac	200-201
91	Symantec	12
131	Symmetry Corporation	199
87	T/Maker	206
41	Tektronix	66
89	Teleware	173
173	Texas MacStuf	318-319
101	Third Wave Computing	295
195	Thunderware, Inc.	45
112	Timeslips Corporation	33
116	Timeworks, Inc.	169
187	U.S. Computer Merchants	285
169	Ventura Software, Inc.	196
361	Zedcor	239
400	Zmac	276

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51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
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1. Please indicate which of the following computers you currently use in your company or organization: (check all that apply)

- ☐ a) Mac Plus
- ☐ b) Mac SE
- ☐ c) Mac II
- ☐ d) IBM PC
- ☐ e) Other

2. For how many micro computers do you buy products?

- ☐ f) 1-4
- ☐ g) 5-49
- ☐ h) 50+

3. Your primary job function is: (check one)

- ☐ i) Administrative/General Management
- ☐ j) MIS/DP, Communications Systems, Programming
- ☐ k) Engineering/R&D
- ☐ l) Finance/Accounting
- ☐ m) Marketing/Sales
- ☐ n) Computer Dealer/VAR

4. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (Check all that apply)

SOFTWARE
- ☐ o) Accounting
- ☐ p) Spreadsheets/ Financial Planners
- ☐ q) Project Managers
- ☐ r) Word Processors
- ☐ s) Database Managers
- ☐ t) Graphics
- ☐ u) CAD/CAM
- ☐ v) Communications

HARDWARE
- ☐ w) Mainframe
- ☐ x) Mini
- ☐ y) PC
- ☐ z) Printers/Plotters
- ☐ 1) Monitors
- ☐ 2) Disk/Tape Back-up
- ☐ 3) Add-in Boards
- ☐ 4) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?

- ☐ 5) Yes
- ☐ 6) No

6. If so, what function do you serve in the buying process?

- ☐ 7) Evaluations/Specification
- ☐ 8) Recommendation
- ☐ 9) Buyer/Purchaser

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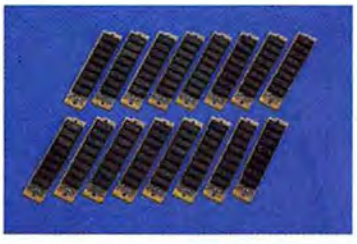
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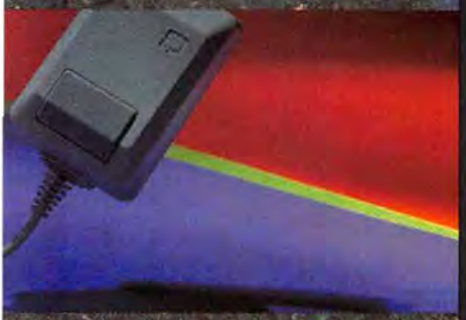


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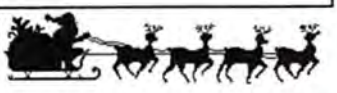


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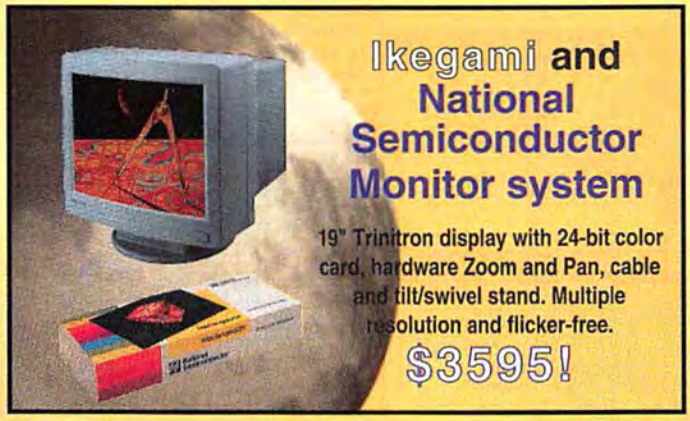
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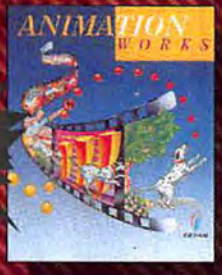


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- AshlarVellum 655

ASHTON TATE
- FullWrite (Get Full Impact FREE) .. 135
- Full Impact (Get FullWrite FREE) .. 135

AVERY
- MacLabelPro 47
- Labels Available CALL

BRODERBUND
- TypeStyler 112
- Where in Time is Carmen Sandiego 29

CAERE
- OmniPage 499

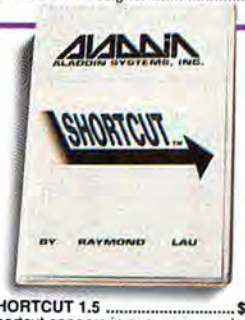
CENTRAL POINT
- Mac Tools Deluxe 72

CERES
- Inspiration 115

CE SOFTWARE
- Quickmail 10 User 298
- QuicKeys 96
- DiskTop 4.0 64

CHIPSOFT
- TurboTax Personal/1040 52

CLARIS
- MacWrite II 139
- FileMaker Pro 209
- MacDraw II(including ATM) 275
- ClarisCad 625
- SmartForm Designer 279



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CUSTOM APPLICATIONS
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DELTA POINT
- DeltaGraph 105

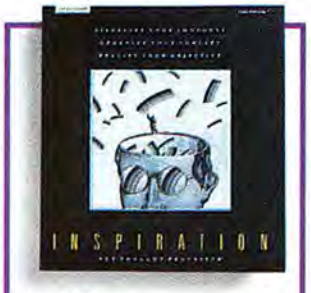
DIGITALK
- Smalltalk/V Mac 119

DREAMMAKER SOFTWARE
- Cliptures Vol 1, 2, or 3 65
- MacGallery 26

DYNAWARE
- DynaPerspective 3D 679

FARALLON
- Timbuktu 88
- Timbuktu Remote 126

FRANKLIN SOFTWARE
- Language Master 57



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FREESOFT
- White Knight 81

HYPERPRESS
- PictureLink 141

ICOM SIMULATIONS
- On Cue 34
- TMON 85
- HyperTMON 56

INNOVATIVE DATA DESIGN
- Dreams 315
- MacDraft 185

INSIGHT DEVELOPMENT
- MacPrint 89

INSIGNIA
- Soft PC 242

INT'L BUSINESS SOFTWARE
- Dataclub 175

LANGUAGE SYSTEMS
- Fortran with MPW 398
- Wild Things 119

LAYERED SOFTWARE
- AtOnce 275
- Insight Expert per module 388

LEXPERTISE
- MacProof 104

MACROMIND
- Macromind Director. 435
- Accelerator 125

MAGNA
- Empower I 119
- Empower II 213

MANAPRO
- General Ledger 480

MICROCOM
- Carbon Copy Mac 115
- Virex 55
- Virex 10 Pack 345

MICROFRONTIER
- Enhance 229

MICROLYTICS
- Inside Information 63
- Gofer 52
- Wordfinder 34

MICROSOFT
- Word 4.0 243
- Excel 243
- Help for Excel with Excel purchase . 25
- Power Point 243
- Microsoft Office 522



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NOW SOFTWARE
- ScreenLocker 43
- Now Utilities 86

ODESTA CORPORATION
- Double Helix 365
- Data Desk 465

OLDUVAI
- Videopaint 245

ON TECHNOLOGY
- On Location 71

PANTONE
- Process Color Imaging Guide 46

PARACOMP
- Model Shop 369
- Swivel 3D 289
- Swivel 3D Professional 429

PARAGON
- Nisus 238



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- Address Book Plus with Binder 75
- Calendar Creator 35
- Fast Forms 106

PREFERRED PUBLISHING
- DAtabase 65
- Exposure Pro 65
- Personality! 49

PRE-PRESS TECHNOLOGIES
- SpectreSeps—Quark/Pagemaker . 195
- SpectreScan 299

QMS
- UltraScript 114

QUARK
- QuarkXPress 509
- QuarkStyle 166



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REALITY TECHNOLOGIES
- WealthBuilder 142

SALIENT
- DiskDoubler 42

SERIUS CORP.
- Serius Programmer. 194
- Serius Developer 324

SITKA
- Network Bundle for MAC 179
- Network Bundle for DOS 149

SOFTVIEW
- if:X Forms Designer 164
- Business Expense Reports 47
- MacInTax 56
- Personal Tax Analyst 46
- Quarterly Payroll Tax 84
- 13 States available CALL

SOFTWARE DISCOVERIES
- RecordHolder Plus 78

SOFTWARE VENTURES
- Microphone II 209

SOLUTIONS INTERNATIONAL
- Smartscrap 46
- SuperGlue II 59
- The Curator 69



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STUDIOTRONICS
- Colorset 209

SUPERMAC
- Pixel Paint Professional 385
- Pixel Paint 226

SYMANTEC
- Norton Utilities 79
- SAM 63
- SUM II 104
- Think C 4.0 159

TACTIC SOFTWARE
- ClairVoyant 45
- Icon It! 45
- Sound Clips 45
- ArtClips 45
- ArtFonts 45
- FontShare 125

TELETYPESETTING
- TScript 89

TIMEWORKS
- Publish it! Mac 219
- Publish it! Mac Easy 109

T-MAKER
- Write Now. 115
- ClickArt From 33

VERTICAL SOLUTIONS
- FastLabel 86
- FastEnvelope 48

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- Mac - 101 Keyboard (for Plus) 119

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- Personal Scan 669

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- ColorPage T16 2120
- QuickView Z21 1762
- E-Machines TX 3182
- E-Machines T19 3995

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- MacTilt 66

FARALLON
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KEYTRONICS
- MacPro with Tempo II 116

KINETICS
- Ether Port II 484
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Stika FlashCard	155
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Stika Network Bundle Mac	189
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Solutions Faxgate Plus	233
Solutions Mail Maker 5 User	114
White Pine Exodus X Windows	329

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White Pine Mac 240	131
White Pine Mac 241	195

CD Rom

Activision Manhole CD	47
BigTime TV	235
BMUG PD Rom Vol 1	52
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NEC Port CDRom/interface	483
NEC Type Gallery PS	259
Toshiba CD Rom Drive	759
Voyager AudioStack	68
Voyager Bach: Brandburg Concerto	68
Voyager VideoStack	68
Warner Media Beethoven	43
Warner Media Magic Flute	43
Whole Earth Catalogue	86

Digitizers

HARDWARE

AudioMedia	729
Calcomp 12x12 Tablet	395
Calcomp 12x18 Tablet	735
Calcomp 18x24 Tablet	1345
Calcomp WiZ Pen	53
Calcomp WiZ Tablet	139
Farallon MacRecorder	152
Farallon MacRecorder w/o soft	92
Farallon MediaTrack&MacRecord	315
Farallon MediaTracks	187
Kurta 8.5x11	251

Emulation/Translation

Dayna Dos Mounter	49
Insignia Access PC	78
Insignia SoftPC AT/Drive 1200/Rapport	665
Insignia SoftPC with AT/EGA	339
Orange Micro Mac 286	1109

Mouse/Keyboard

Abaton Pro Point	87
Appoint Mouse Pen ADB	83
Curtis MVP Mouse	87
Datadesk Mac 101 ADB	129
Kensington TurboMouse	109
Keytronic MacPro Keyboard	117
LittleMouse ADB	76

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TI MicroLaser 35 Postscript	1950

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60 Meg Backup Tape	22
American Power 110SE UPS	215
American Power 370d UPS	339
AntiGlare SE Anti-Radiation	51
HP DeskJet Cartridges	17
ImageWriter Black Ribbons	3
ImageWriter Color Ribbons	3

HARDWARE

ImageWriter Multi Color Ribbon	11
Jet Fil Desk Jet Re-Fill	10
Mac Tilt/Swivel	22
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Fontographer	253
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Int Picker	42
Inside Information	69
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Hypercard V2.0 Call
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QM-MHS Gateway 138.
Quickmail (10 Users) 308.
Quickmail (1-5 Users) 208.
Quickmail 2.2 (50 Users) 1469.
Chang Labs
C.A.T. III 279.
CheckMark Software
Cash Ledger 113.
MultiLedger 1.3 229.
Payroll 172.
Chip Soft
Turbo Tax 52.
Claris
FileMaker Pro 225.
MacProject II 364.
MacWrite II 142.
CompuServe
Compuserve Navigator 48.
Starter Kit/Mac Info.Manager 21.
Starter Kit/Navigator Bundle 65.
DataViz
Maclink Plus PC 4.0 W/Cable ... 118.
Maclink Translators 98.
DeltaPoint
DeltaGraph 1.5 109.
Deneba Software
BigThesaurus 63.
Coach Professional .. 123.
Farallon
Timbuktu 3.1 (30 Pk) 1279.
Timbuktu 3.1 One User 94.
Timbuktu Remote 122.
Fox Software
FoxBASE+/Mac 289.
FoxBASE+/Mac MultiUser 384.
FoxBASE+/Mac Runtime 175.
Freesoft
White Knight 11 83.
Hayes
Smartcom II 3.1 83.
Informix
Wingz 244.
Insight Development
Macprint 1.2 92.
Insignia Solutions
Access PC 62.
SoftPC for the Mac Portable 244.
Soft PC 244.
SoftPC-AT/EGA Module 125.
Intuit
Quicken 1.5 35.
Kiwi Software Inc.
KiwiEnvelopes! 32.
KiwiFinder Extender 65.
Lexpertise U.S.A. Inc.
MacProof 109.
Mainstay
MacFlow 3.12 125.
MacSchedule 2.0 125.
Meca Software Inc.
Managing Your Money 3.0 122.
Microsoft
Excel 2.2 239.
Office 519.
Office CD-ROM 599.
PowerPoint 242.
Word 4.0 239.
Works 2.0b 176.
Nolo Press
For The Record 34.
Will Maker 4.0 36.
Odesta
Double Helix Release 3 III 369.
Double Helix III Multiuser Kit 289.
Paragon Courseware
Nisus 3.0 235.
Qued-M 98.
Portfolio Systems
Dynodex Instant Address Book ... 62.
Power Up!
Address Book+ Leather Notebook 83.
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Prescience
Expressionist 2.07 86.
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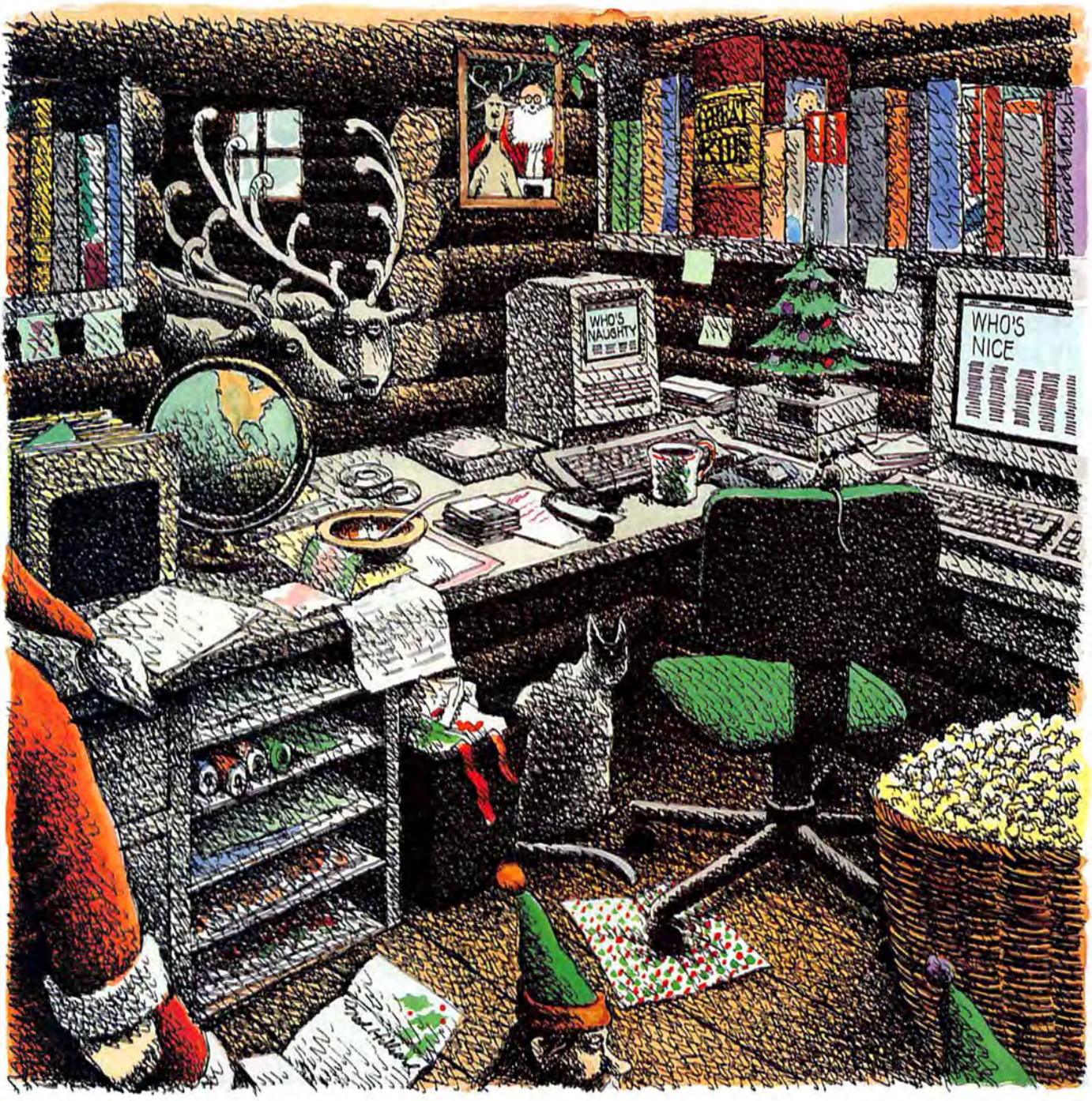
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Inbox 3.0 Mac Admin. 209.
Inbox 3.0 Plus Mac 625.
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Tops 3.0 Network Bundle 186.
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Lap-Link Mac Network Pac 94.
Lap-Link Mac Connect. Pac 94.
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WordPerfect 226.
Zedcor Inc
Desk 219.

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Graphics & Symbol 49.
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ATM Plus Pack 107.
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Collectors Editions I 78.
Illustrator 3.0 w/ATM 2.0 345.
Photoshop 495.
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PubPak 2: Forms & Scheds. 275.
PubPak 3: Presentations 275.
Smart Art 1-4 83 ea
Streamline 224.
Type Align 57.
Type Manager 55.
Type Reunion 38.
Type Set 1 or 2 57.
Type Set 3 114.
Aldus
Freehand 2.02 325.
Pagemaker 4.0 495.
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PrePrint 325.

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Fontographer 3.0 245.
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Vellum 685.
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TypeStyler 114.
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Ultrapaint 119.
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Fontina 36.
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Studio/32 448.
FM Waves
Artware
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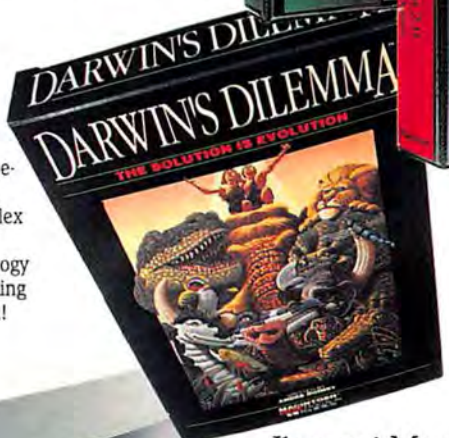


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Disk Doubler 45.
Partner 55.
Software Innovations
HandOff II 49.
Somak
SharpenUp 59.
SuperMac Software
SuperLaserSpool 1-5 Users 285.
SuperLaserSpool 2.0 84.
Symantec
Norton Utilities for the Mac 85.
S.A.M. 64.
S.U.M. II 96.
Synergy Software
Versa Term 88.
Versa Term Pro 3.0 174.
Vertical Solutions
FastCat 51.
FastEnvelope DA 45.
FastLabel 45.

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Access Software
World Class Leader Board 32.
Accolade
Fastbreak 28.
Grand Prix Circuit 27.
Hardball 25.
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Test Drive II The Duel 31.
Activision
Cosmic Osmo 39.
Manhole 28.
Manhole CD Version 34.
Baseline Publishing
Talking Moose 22.
Broderbund
Ancient Art Of War 26.
Ancient Art Of War At Sea 26.
Playmaker Football 29.
Shufflepuck Cafe 23.
SimCity 1.1 28.
SimCity Supreme 47.
Star Wars 23.
The Playroom 29.
Carmen San Diego (Eurcpe)? 29.
Carmen San Diego (U.S.A)? 29.
Carmen San Diego (World)? 29.
Carmen San Diego (Time)? 29.
Bullseye Software
Ferrari Grand Prix 32.
P-51 Mustang Flight Simulator 31.
Casady & Greene
Crystal Quest 2.2 32.
Crystal Quest & Critter Ed. 48.
Mission Starlight 29.
Sky Shadow 29.
Centron
Casino Master B & W 42.
Casino Master Deluxe Color 48.
Delta Tao Software
Spaceward Ho! 35.
Strategic Conquest 2.0 35.
Electronic Arts
Bard'S Tale 31.
Blockout 26.

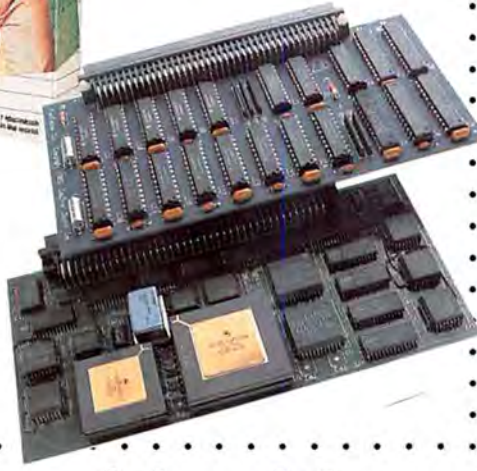
Think C 4.0 160.
Lightspeed Pascal 3.0 159.
TGS Systems
Prograph 239.
Zedcor Inc
ZBasic 5.0 114.

UTILITIES

Aladdin Systems
Shortcut 44.
StuffIt Deluxe 1 59.
Alsoft
Diskexpress II w/MultiDisk 52.
ASD Software Inc.
FileGuard 2.5 128.
FileGuard 2.5 (10-User) 619.
FileGuard 2.5 (5-User) 368.
Baseline Publishing
1 Shot Worksheet 59.
APB Express 59.
INIT Manager 34.
Beagle Brothers Software
Flash 119.
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Stepping Out 49.
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Silicon Beach Software
- Apache Strike 1.1 31.
- Beyond Dark Castle 31.
- Dark Castle 31.

Software Toolworks
- Cribbage King/Gin King 28.
- Hunt For Red October 20.
- Life And Death 31.

Spectrum Holobyte
- Falcon 2.2 30.
- PT-109 26.
- Solitaire Royale (Color) 19.
- Tetris 19.
- Welltris 20.

Strategic Simulations, Inc.
- AD&D: Pool Of Rad/Curse 34.
- AD&D: Pool Of Rad 32.

Strategic Studies Group
- American Civil War Vol 2 .. 28.
- Gold of the Americas 30.
- Halls Of Montezuma 28.
- Panzer Battles 28.
- Reach for the Stars 30.

Three Sixty
- Armor Alley 34.
- Harpoon 39.
- Sands Of Fire 32.

Toyogo, Inc.
- Go Junior Call
- Nemesis Go Master 47.
- Go Master Deluxe 95.

- Joseki Tutor 28.
- Tactical Wizard 34.

XOR Corporation
- Bermuda Square 19.
- Lunar Rescue 32.
- MacCourses 19.
- MacGolf Classic 52.
- MacSki 38.
- NFL Challenge 53.
- Road Racer 38.
- TaskMaker 26.

EDUCATIONAL

Bright Star Technology
- Alphabet Blocks 29.
- Hyper Animator 1.5 96.
- InterFACE 239.
- Talking Tiles 25.

Broderbund
- Calculus 57.
- Geometry 57.
- Physics 57.
- Type! 18.

Carina
- Voyager 87.

Davidson & Associates
- Math Blaster 26.
- Speed Reader II 26.

First Byte
- Dinosaur Discovery Kit 26.
- Puzzle Storybook 26.
- Spell-A-Saurus 29.

Great Wave Software
- Kidsmath 26.
- Kidstime 25.
- Number Maze 25.

HyperGlot Software
- Japanese-KanjiMaster Beg 98.
- Learning To Speak French-CD ROM 174.

Chinese
- Writing Tutor 41.

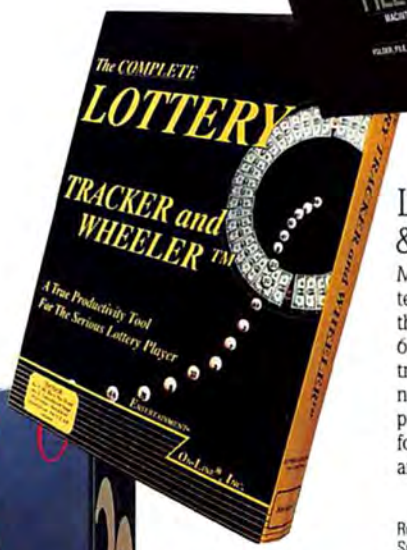
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- Spanish Level 1 or 2 35.

Personal Training Systems
- Mac Carries All PTS Mac Products 52. ea.

Simon & Schuster
- Typing Tutor IV 28.

Software Toolworks
- Mavis Beacon Typing 32.

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- Virtual- 68030 Macs 110.
- Virtual W/PMMU 185.

Datadesk
- Funtion Key Module 38.
- Hyper Dialer 24.
- Mac 101 Keyboard 129.
- SwitchBall 119.
- Switchboard 169.

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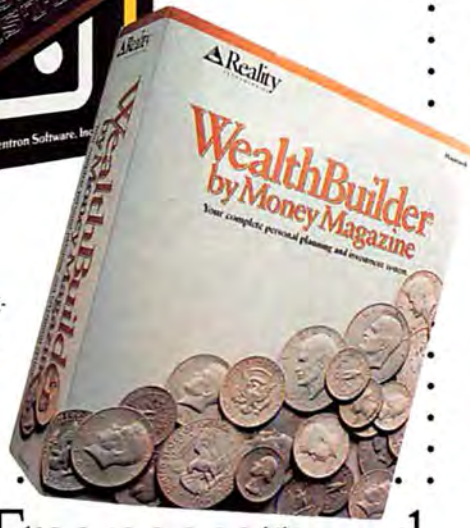
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- DoveFax Desktop 269.

MacSnap
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- 524E (512kE to 1mb) 179.
- 524S (512kE to 1mb w/SCSI) 235.
- 548 (512k to 2mb) 429.
- 548E (512kE to 2mb) 415.
- 548S (512kE to 2mb w/SCSI) 475.
- SCSI Port Adapter 109.

Marathon
- 68030 for Mac IIX 439.
- 68030 for Plus 445.
- 68030 MultiComm 315.
- 68030 for Mac II 439.
- 68030 for SE 435.
- Racer 148.
- 68030 Parallel/Serial 189.

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- EMAC DAT 1.3 Gig Tape Backup 2796.
- EMAC 150MB Tape Backup 975.
- MD2400 Baud Modem MNP-5 . 169.

Farallon
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- MacRecorder Voice Digitizer 89.
- Media Tracks MM Pack 319.
- Media Tracks MM Pack CD 319.
- Media Tracks 189.
- Portable Pack 325.
- Remote/9600V32 Modem Pack 839.

PhoneNET
- DB9 28.
- Din-8 30.
- Star Connector 17.
- Star Conn.(10Pk) 119.
- Repeater 309.
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- PowerKey 64.
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Supra Corp.
- Supra Modem 2400 Baud 118.
- Supra Modem 2400 MacPac 169.
- Supra Modem 2400 Plus 158.

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U.S. Robotics
9600 Hst Modem ... 675.

ACCESSORIES

Acco
DiskPage/10 Pages/120 Disks ... 28.
Advanced Gravis
Mousestick 512K/Plus ... 63.
Mousestick ADB ... 64.

Altra
Felix ... 124.

American Power Conversion
UPS 110SE ... 205.
UPS 370 CI ... 295.

Apple
Toner/Laserwriter II ... 105.
Toner/Laserwriter Plus ... 99.

C-Enterprises
AB Box (ADB) ... 38.
ABCD Box (ADB) ... 49.

Casio
CasioLink/Mac ... 89.
B.O.S.S.
SF-8000 ... 215.
SF-9500 ... 245.

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SE Radiation/Anti-Glare Filter ... 52.
Super Base ... 33.
Tilt Swivel ... 22.
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Little Mouse+ ... 74.
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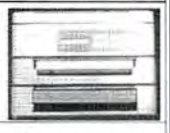


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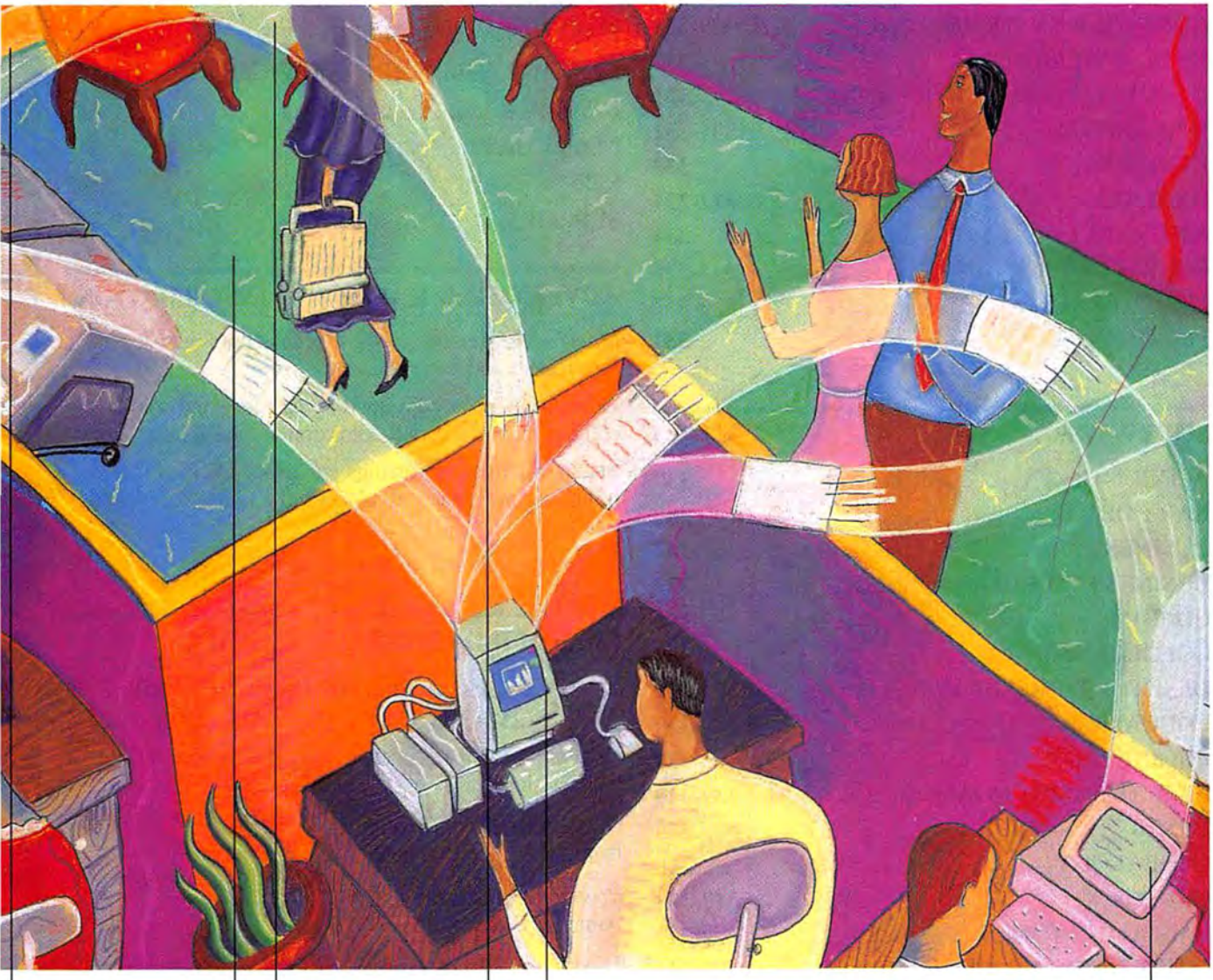
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HARDWARE 329-337

BAR CODE 329
CD-ROM 329
COMPUTER SYSTEMS 329-331
DATA ACQUISITION 331
DATA RECOVERY SERVICES 331
DISK DRIVES 331-332
DISKETTES 332
GENERAL 332-334
INSURANCE 334
MEMORY UPGRADES 334-336
PERIPHERALS 336-337
PRINTERS 337

SOFTWARE 337-343

ACCOUNTING 337
BAR CODE 337
BUSINESS 337
BUSINESS TIME MANAGEMENT 337
CD-ROM 338
COLOR IMAGING 339
DESKTOP PUBLISHING 339
EDUCATIONAL 339
ENGINEERING 339
ENTERTAINMENT/GAMES 339-340
FONTS 340
GENEALOGY 340
GRAPHICS 340-341
LANGUAGE TOOLS 341
LOTTERY/GAMBLING 341
MEDICAL/DENTAL 341
MUSIC/MIDI 341
PRINT DRIVERS/SPOOLERS 341
PUBLIC DOMAIN 341
RELIGION 342
SCIENTIFIC 342
SHAREWARE 342
STACKWARE 342-343
TAXES 343
UTILITIES 343

MISCELLANEOUS 343-345

ACCESSORIES 343
BOOKS/CATALOGUES/PUBLICATIONS 343
DATA CONVERSION SERVICES 344
DESKTOP PUBLISHING SERVICES 344-345
INSURANCE 345
NOVELTIES 345
SERVICES 345
SUPPLIES 345

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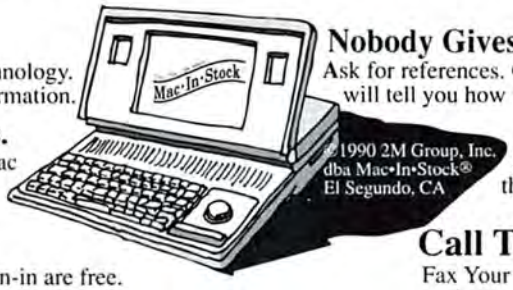
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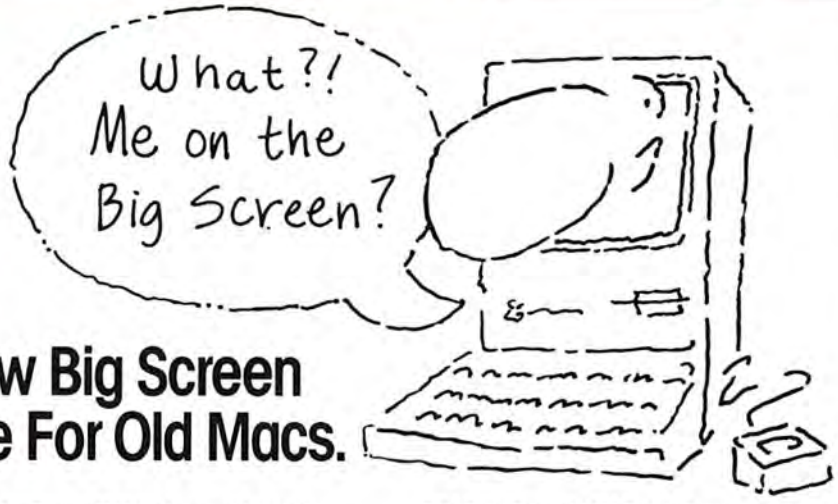
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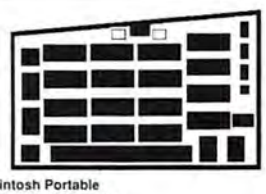
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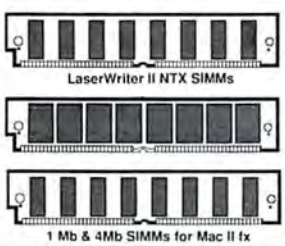
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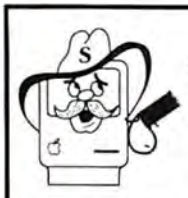
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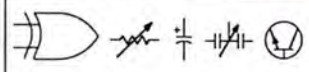
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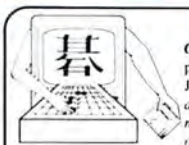
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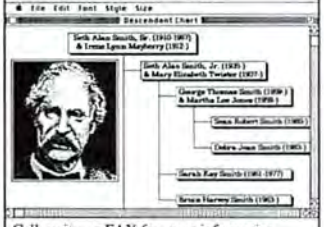
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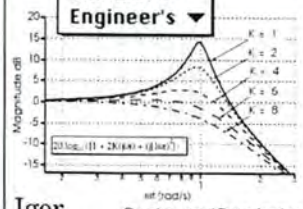
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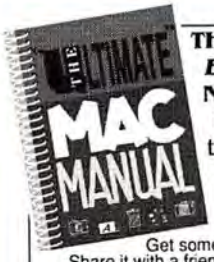
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The Gloom and Doom Boom



Apple is doomed. It was doomed when it was a $100 million company. It was doomed when it was a $1 billion company. No doubt it will be doomed when it's a $10 billion company



As the new year begins, Apple is under attack for losing some of its market share to the PC-clone mania last year. The situation at Apple was worsened by the release of Windows 3.0 — a program that mimics the Mac interface. As sales and profits increase, everyone is predicting the worst for Apple. They always have: They always will.

Observers always predict the worst for IBM too. They say that mainframes are dead and that IBM is out of touch and will fall apart any minute. DEC is doomed too. The minicomputer is a dead duck. The company will go broke any minute — just you wait.

So nobody is really picking on Apple. It seems that, for some strange reason, *all* computer companies are bad ideas.

I heard the gloom and doom about Apple long before its first $100-million year. "Too big. It won't be able to handle those numbers." Then Apple approached its first billion-dollar year. "It'll never survive. It's too big. It'll fall apart." I suppose when Apple cracks $10 billion, it will be even worse off than it was when it was making $100 million.

It never ends. Sure, someday IBM, Apple, and DEC will fold up their tents. They may be sold, or they may break up. But it could be the year 3015 when it happens.

So here's the mystery: Why do we keep hearing predictions of gloom and doom for companies that are profitable year after year and growing at a steady rate?

Perhaps it's because many computer companies *do* fail. Micromakers, minimakers, mainframe makers, super makers. They go broke more often than not. In our category, desktop computers, there were a slew of losers over the last decade: Dot, Polo, Adam, Morrow Micro Decision.

I suppose that because of failure after failure, we can generalize about success. It's impossible to succeed.

Tell it to the judge. A quick look at the success of the PC and the Mac makes it clear why IBM and Apple continue to grow despite the experts' predictions.

Part of the success is due to piracy. IBM and Apple have machines that invite easy software piracy. Companies such as DEC, which entered the low-end market with secure systems (and even sold preformatted disks), have failed miserably. Machines with oddball drives or imbedded serial numbers can never make it in this market.

It's not that people pirate software to use it. They pirate to play with software free and buy it later if they want it. Software vendors hate the idea that someone is using their $900 database manager borrowed (or copied) from a friend. They perceive this as a lost sale. I used to argue that this wasn't really a lost sale but rather a sales tool. People who pirate software usually don't buy it in the first place, so it's not a lost sale. It's just sitting on a shelf.

Recently I've altered my interpretation of this phenomenon and now conclude that some sales are actually lost. When you get to play free with some of the junk out there and decide not to buy it, then a sale may have been lost. If easy copying weren't possible, then the software would be sold to a dissatisfied customer — but it would still be a sale. A gyp rip-off sale, but a sale nonetheless. I have no sympathy for this lost-sale victim.

Anyway, the freedom to look at software without penalty is not understood by companies such as the defunct Fortune Systems, which came on the scene years ago with one of the earliest and cheapest UNIX/68000 systems. Unable to identify with the end user, it made the machine secure.

Even the slew of PC cloners almost have to try to go out of business nowadays. These companies offer nothing special in terms of R&D or support — they are selling disk-copying machines that let users recoup their hardware investment by bootlegging just a few pieces of software. It's the modern (pirate) equivalent of bundling. So the hardware makers are getting filthy rich. The few cloners that go broke are simply mismanaged.

The fact is that the market is a bonanza for anyone who wants to play. Apple is making a ton of money. IBM is making a ton of money. They're all making a ton of money.

So why all the doom and gloom? It's because failure is more fun than success. You can analyze a failure. You can say, "I knew it," or, even better, "I told you so!" You can tell people what they did wrong. You can say how you would have done it better. It's much more fun than passively watching someone succeed.

Everyone loves a loser. It makes us feel better because the loser isn't us. It gives us a chance to pontificate. But when the "loser" is Apple or IBM and they ain't losing, what do we do? Predict they'll be losers and analyze it as though they already were. That's what we can expect to see in 1991: nonfailures.

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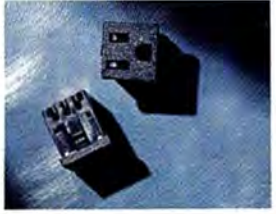
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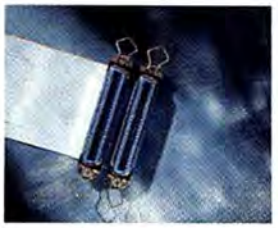
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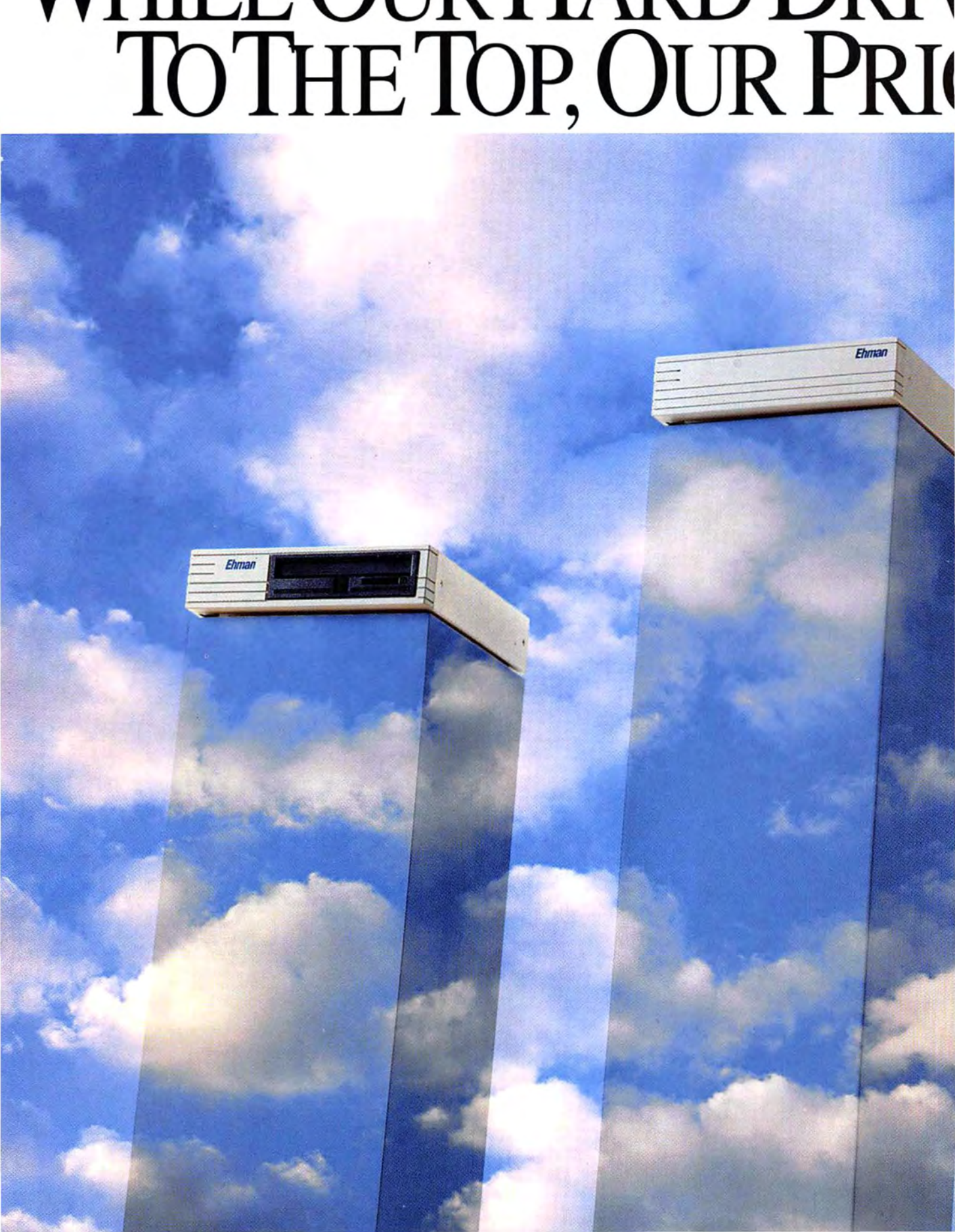
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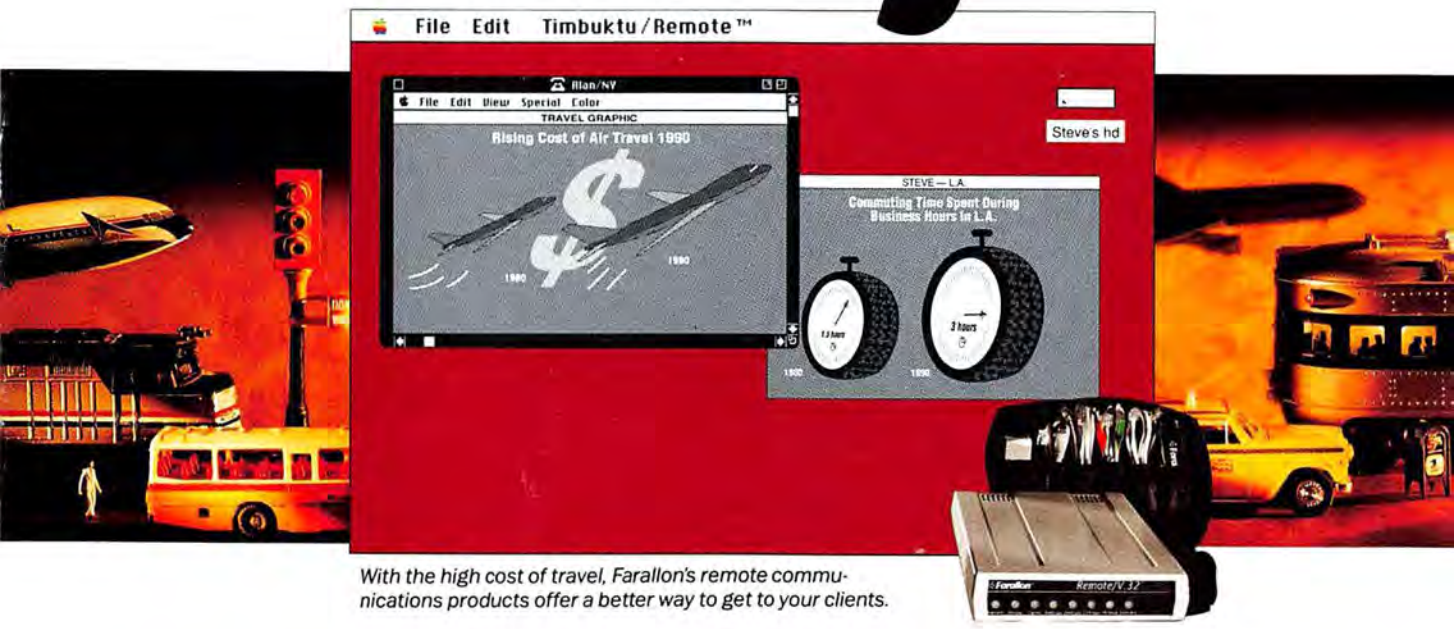
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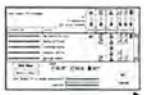
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